

SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name: Candice Thompson Examiner #: 792114 Date: 3/13/05
Art Unit: 1714 Phone Number 301-330 Serial Number: 2225 10/718, 360
Mail Box and Bldg/Room Location: 10078 Results Format Preferred (circle): PAPER DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc. if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: organic electroluminescent element display
Inventors (please provide full names): Mitsunuo Fukada; Hiroshi Kita;
Takeshi Yamada
Earliest Priority Filing Date: 11/20/02

For Sequence Searches Only Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.

please do a search on claims 1-12
Thanks

STAFF USE ONLY	Type of Search
Searcher: <u>ULH</u>	NA Sequence (#) <u>STN # 461-90</u>
Searcher Phone #: _____	AA Sequence (#) _____
Searcher Location: _____	Structure (#) <u>1</u>
Date Searcher Picked Up: <u>3/22/05</u>	Bibliographic _____
Date Completed: <u>3/22/05</u>	Litigation _____
Searcher Prep & Review Time: <u>60</u>	Fulltext _____
Clerical Prep Time: <u>20</u>	Patent Family _____
Online Time: <u>120</u>	Other _____
	Vendors and cost where applicable
	Questel/Orbit _____
	Dr Link _____
	Lexis/Nexis _____
	Sequence Systems _____
	WWW/Internet _____
	Other (specify) _____



STIC Search Report

EIC 1700

STIC Database Tracking Number: 147758

TO: Camie Thompson
Location: REM 10D78
Art Unit : 1774
March 22, 2005

Case Serial Number: 10/718360

From: Usha Shrestha
Location: EIC 1700
REMSSEN 4B28
Phone: 571/272-3519
usha.shrestha@uspto.gov

Search Notes



STIC Search Results Feedback Form

EIC17000

Questions about the scope or the results of the search? Contact *the EIC searcher or contact:*

Kathleen Fuller, EIC 1700 Team Leader
571/272-2505 REMSEN 4B28

Voluntary Results Feedback Form

- I am an examiner in Workgroup: Example: 1713
➤ Relevant prior art **found**, search results used as follows:

- ☐ 102 rejection
- ☐ 103 rejection
- ☐ Cited as being of interest.
- ☐ Helped examiner better understand the invention.
- ☐ Helped examiner better understand the state of the art in their technology.

Types of relevant prior art found:

- ☐ Foreign Patent(s)
- ☐ Non-Patent Literature
(journal articles, conference proceedings, new product announcements etc.)

➤ Relevant prior art **not found**:

- ☐ Results verified the lack of relevant prior art (helped determine patentability).
- ☐ Results were not useful in determining patentability or understanding the invention.

Comments:

Drop off or send completed forms to EIC1700 REMSEN 4B28



What is claimed is:

1. An organic electroluminescent element comprising a component layer including a light emission layer, wherein the light emission layer contains a phosphorescent compound, and the component layer contains a compound represented by the following formula 1,

Formula 1



wherein A represents a substituted or unsubstituted aromatic ring residue; n is a natural number of from 3 to 6; and Z represents a monovalent organic group represented by the following formula 2, provided that formula 1 does not have an n -fold axis of symmetry,

Formula 2



wherein L represents a chemical bond or a divalent linkage group; and Cz represents a substituted or unsubstituted carbazole residue.

2. The organic electroluminescent element of claim 1, wherein the light emission layer contains the compound of formula 1.

3. The organic electroluminescent element of claim 1, wherein n in formula 1 is 3, provided that the formula 1 does not have a 3-fold axis of symmetry.

4. The organic electroluminescent element of claim 1, wherein the aromatic ring of the aromatic ring residue represented by A of formula 1 is an aromatic ring selected from the group consisting of a benzene ring, a pyridine ring, a pyridazine ring, a pyrimidine ring, a pyrazine ring, a 1,3,5-triazine ring, a 1,2,4-triazine ring, a pyrrole ring, an imidazole ring, a furan ring, a thiophene ring, and a condensed aromatic ring which two or more thereof are condensed to form.

5. The organic electroluminescent element of claim 1, wherein in formula 1, at least one Z has a chemical structure different from that of another Z.

6. The organic electroluminescent element of claim 4, wherein the aromatic ring of the aromatic ring residue is a benzene ring, a pyridine ring, or a 1,3,5-triazine ring.

7. The organic electroluminescent element of claim 1, wherein in formula 2, L is a chemical bond or a group selected from the group consisting of arylene, heteroarylene, alkenylene and $-\text{Si}(\text{R})_2-$ in which R represents an alkyl group, a cycloalkyl group, an alkenyl group, an alkynyl group, an

aryl group, a heteroaryl group, a saturated heterocyclic group or a halogenated hydrocarbon group.

8. The organic electroluminescent element of claim 7, wherein L is a chemical bond.

9. The organic electroluminescent element of claim 1, wherein the phosphorescent compound is a complex containing a metal belonging to a group VIII of the periodic table as a center metal or a complex containing a rare earth element as a center element.

10. The organic electroluminescent element of claim 9, wherein the phosphorescent compound is an iridium complex, an osmium complex, or a platinum complex.

11. The organic electroluminescent element of claim 10, wherein the phosphorescent compound is an iridium complex.

12. A display comprising the organic electroluminescent element of any one of claims 1 through 11.

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SEL RN

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98-80-6/BI)
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L3 STR
L4 STR L3

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D QUE STAT L5
L6 2316 SEA SSS FUL L4
SAV L6 THM360/A

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(ELECTRO OR ORGANO OR ORG#) (2A)LUM!N? OR LIGHT?(2A) (EMI
T? OR EMISSION?) OR EL OR E(W)L OR L(W)E(W)D OR
OLED)/IB,AB OR LED/IT
L9 11 SEA ABB=ON PLU=ON L7(L)L8

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L11    61  SEA ABB=ON   PLU=ON   L10(L)PREP/RL
L12    41  SEA ABB=ON   PLU=ON   L11 AND L8
L13    31  SEA ABB=ON   PLU=ON   L12 AND OPTIC?/SC
      D FHITSTR
      D FHITSTR 2-5
L14    40 SEA ABB=ON   PLU=ON   L9 OR L13
L15    1  SEA ABB=ON   PLU=ON   L14 AND L1
      SEL L14 HIT RN 1-

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FILE HCAPLUS

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FILE REGISTRY

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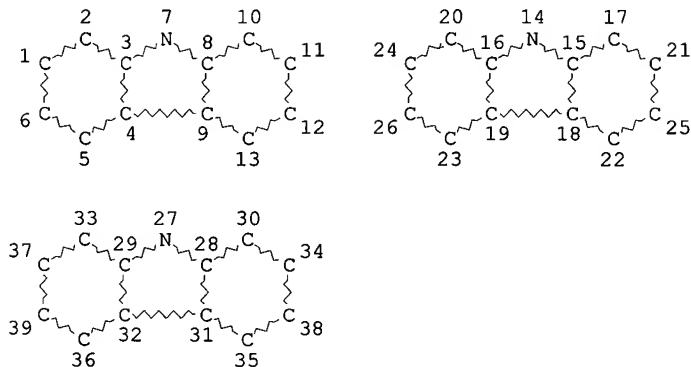
FILE LREGISTRY

LREGISTRY IS A STATIC LEARNING FILE

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L4          STR

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NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED

NUMBER OF NODES IS 39

STEREO ATTRIBUTES: NONE

L6 2316 SEA FILE=REGISTRY SSS FUL L4

L7 1026 SEA FILE=HCAPLUS ABB=ON PLU=ON L6

=> fil hcap

FILE 'HCAPLUS' ENTERED AT 15:01:27 ON 22 MAR 2005

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=> d l14 1-40 ibib abs hitstr hitind

L14 ANSWER 1 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2005:155660 HCAPLUS

DOCUMENT NUMBER: 142:248684

USHA SHRESTHA REM 4B28

TITLE: Tetraaminobiphenyls, their charge transporting or electroluminescent materials, and organic electroluminescent devices using them

INVENTOR(S): Yabe, Masayoshi; Shiotani, Takeshi; Sato, Hideki; Akiyama, Seiji

PATENT ASSIGNEE(S): Mitsubishi Chemical Corp., Japan

SOURCE: Jpn. Kokai Tokyo Koho, 53 pp.
CODEN: JKXXAF

DOCUMENT TYPE: Patent

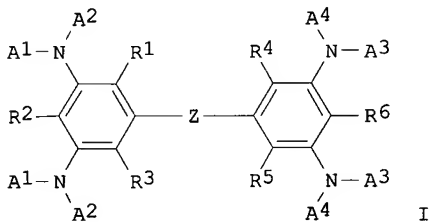
LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO. -----	KIND ---	DATE -----	APPLICATION NO. -----	DATE
JP 2005047811	A2	20050224	JP 2003-202925	2003 0729
PRIORITY APPLN. INFO.:			JP 2003-202925	2003 0729

GI

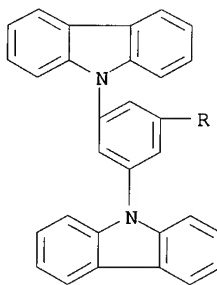


AB The tetraaminobiphenyls are I (A1-A4 = substituent; Z = direct bond, linkage; R1-R6 = H, substituent; A1A2 and A3A4 may form ring). The tetraaminobiphenyls show good heat resistance, and electrolytic oxidation and reduction resistance. Thus, an organic

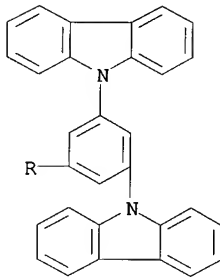
electroluminescent device having an emitter layer containing I (R1 = R2 = R3 = R4 = R5 = R6 = H, NA1A2 = NA3A4 = N-carbazolyl) and organic Ir complex dopant was exemplified.

IT **750573-34-3P 845647-08-7P**
(tetraaminobiphenyls as charge transporting or electroluminescent materials for organic electroluminescent devices)
RN 750573-34-3 HCAPLUS
CN 9H-Carbazole, 9,9',9'',9'''-[1,1'-biphenyl]-3,3',5,5'-tetrayltetrakis- (9CI) (CA INDEX NAME)

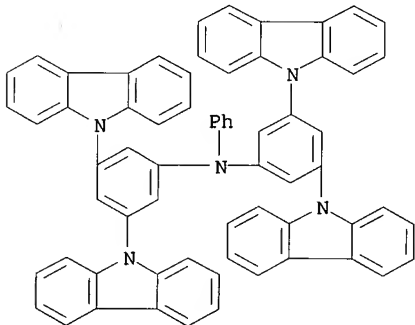
PAGE 1-A



PAGE 2-A



RN 845647-08-7 HCAPLUS
CN Benzenamine, N-[3,5-bis(9H-carbazol-9-yl)phenyl]-3,5-bis(9H-carbazol-9-yl)-N-phenyl- (9CI) (CA INDEX NAME)



IC ICM C07C211-54
ICS C07C211-58; C07C211-61; C07D209-86; C09K011-06; H05B033-14
CC 73-11 (**Optical**, Electron, and Mass Spectroscopy and
Other Related Properties)
Section cross-reference(s): 27
IT **750573-34-3P 845647-08-7P**

(tetraaminobiphenyls as charge transporting or electroluminescent materials for organic electroluminescent devices)

L14 ANSWER 2 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2004:1152881 HCAPLUS

TITLE: Synthesis of thermally stable and hole-transporting amorphous molecule having four carbazole moieties

AUTHOR(S): Nomura, Masayoshi; Shibasaki, Yuji; Ueda, Mitsuru; Tugita, Kouhei; Ichikawa, Musubu; Taniguchi, Yoshio

CORPORATE SOURCE: Department of Organic and Polymeric Materials, Graduate School of Science and Engineering, Tokyo Institute of Technology, Meguro-ku, Tokyo, 152-8552, Japan

SOURCE: Synthetic Metals (2005), 148(2), 155-160
CODEN: SYMEDZ; ISSN: 0379-6779

PUBLISHER: Elsevier B.V.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB A novel thermally stable and hole-transporting amorphous mol., 9,9-bis(4-[bis-(4'-carbazol-9-yl-biphenyl-4-yl)-amino]-phenyl)fluorene (T-Caz) was synthesized in two-step reactions from carbazole. T-Caz showed UV-visible absorption bands at 290 and 340 nm in CHCl₃ solution, and the photoluminescence spectrum showed a maximum peak at 420 nm in a purplish blue region. DSC showed a high glass transition temperature at 250°. The organic **light-emitting** device prepared by spin-coating T-Caz solution onto the In-Sn oxide (ITO)-coated glass substrate in conjunction with tris(8-quinolinolato)aluminum (Alq) and LiF/Al, as an electron transporting light-emissive layer and a metal cathode, resp., showed a maximum luminescence of 10,300 cd/m² at 11 V.

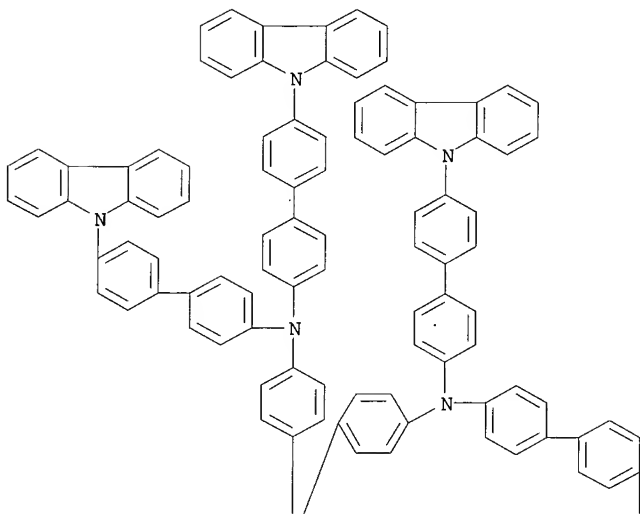
IT 845834-57-3P

(synthesis of thermally stable and hole-transporting amorphous mol. having four carbazole moieties)

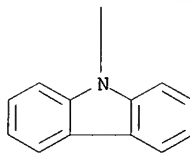
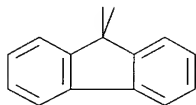
RN 845834-57-3 HCAPLUS

CN INDEX NAME NOT YET ASSIGNED

PAGE 1-A



PAGE 2-A



CC 73-11 (**Optical**, Electron, and Mass Spectroscopy and
Other Related Properties)
Section cross-reference(s): 77, 22
IT **845834-57-3P**
(synthesis of thermally stable and hole-transporting amorphous

mol. having four carbazole moieties)
 REFERENCE COUNT: 19 THERE ARE 19 CITED REFERENCES AVAILABLE
 FOR THIS RECORD. ALL CITATIONS AVAILABLE
 IN THE RE FORMAT

L14 ANSWER 3 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN
 ACCESSION NUMBER: 2004:1127394 HCAPLUS
 DOCUMENT NUMBER: 142:65033
 TITLE: Metal coordination compound, polymer
 composition, and organic electroluminescence
 device using them
 INVENTOR(S): Nomura, Satoyuki; Morishita, Yoshii; Tsuda,
 Yoshihiro
 PATENT ASSIGNEE(S): Hitachi Chemical Co., Ltd., Japan
 SOURCE: PCT Int. Appl., 148 pp.
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2004111066	A1	20041223	WO 2004-JP8392	2004 0609
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW				
RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
JP 2005023070	A2	20050127	JP 2004-171194	2004 0609
JP 2005023071	A2	20050127	JP 2004-171228	2004 0609

JP 2005023072	A2	20050127	JP 2004-171704	
				2004 0609
PRIORITY APPLN. INFO.:			JP 2003-164321	A 2003 0609
			JP 2003-164328	A 2003 0609
			JP 2003-164340	A 2003 0609
GI				

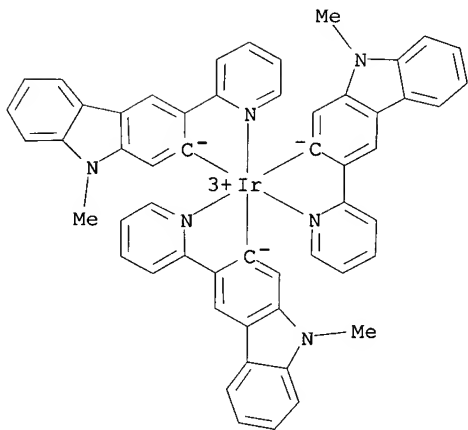
* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT
*

AB A metal coordination compound, characterized in that it is represented by I, II, III, IV, V and VI, [B = >NR, >O, >S, >C=O, >SO₂, and >CR₂; M = Ir, Rh, Ru, Os, Pd and Pt; n = 2 and 3; X₁₋₆ = -R₁, -OR₂, -SR₃, etc. (R₁₋₃ = H, halo, -CN, etc.); when M is Ir, Rh, Ru or Os and n is 2, M is further bonded with another bidentate ligand; and the ring A is a cyclic group containing a N atom bonded to M]. And also provided is a phosphorescence emitting material which **emits a light** in a wide visible region from blue to red and also is excellent in the purity of color, reliability and the like.

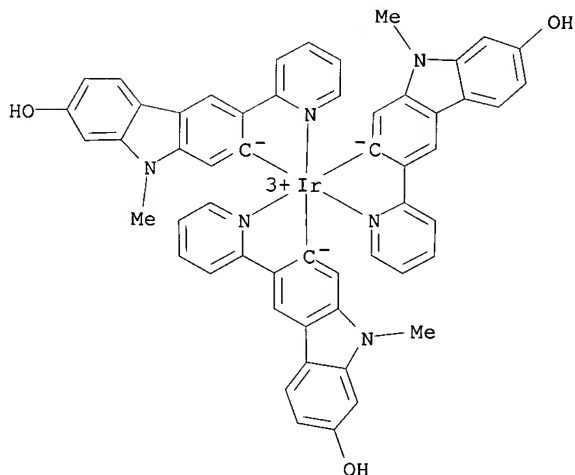
IT **810660-45-8P 810660-48-1P**
(phosphorescent metal coordination compound for organic electroluminescence element)

RN 810660-45-8 HCAPLUS

CN Iridium, tris[9-methyl-3-(2-pyridinyl-κN)-9H-carbazol-2-yl-κC]- (9CI) (CA INDEX NAME)



RN 810660-48-1 HCAPLUS
 CN Iridium, tris[7-hydroxy-9-methyl-3-(2-pyridinyl-κN)-9H-carbazol-2-yl-κC]- (9CI) (CA INDEX NAME)



IC ICM C07F015-00
 ICS C09K011-06; C08K005-34; C08L101-00; H05B033-14
 CC 73-11 (**Optical**, Electron, and Mass Spectroscopy and
 Other Related Properties)
 Section cross-reference(s): 29, 74
 IT **810660-45-8P 810660-48-1P** 810660-51-6P
 (phosphorescent metal coordination compound for organic
 electroluminescence element)
 REFERENCE COUNT: 5 THERE ARE 5 CITED REFERENCES AVAILABLE
 FOR THIS RECORD. ALL CITATIONS AVAILABLE
 IN THE RE FORMAT

L14 ANSWER 4 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN
 ACCESSION NUMBER: 2004:1016012 HCAPLUS
 DOCUMENT NUMBER: 142:13467
 TITLE: Carbazole derivative, organic semiconductor
 device, light-emitting device, and electronic
 device
 INVENTOR(S): Nomura, Ryoji; Seo, Satoshi; Nakashima, Harue
 PATENT ASSIGNEE(S): Semiconductor Energy Laboratory Co., Ltd.,
 Japan

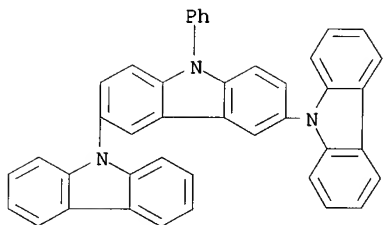
USHA SHRESTHA REM 4B28

SOURCE: PCT Int. Appl., 61 pp.
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2004101517	A1	20041125	WO 2004-JP6435	2004 0513
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG US 2005031899 A1 20050210 US 2004-839123				

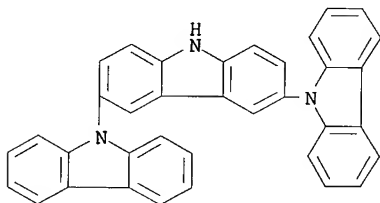
PRIORITY APPLN. INFO.: JP 2003-139432 A 2003
 0516

AB A carbazole derivative with excellent heat resistance which can be
 formed into a film without being crystallized is disclosed. An
 organic semiconductor, a **light-emitting** device and an
 electronic devices manufactured by using such a carbazole derivative
 are also disclosed.
 IT **211685-96-0P 606129-90-2P**, 9,3':6',9''-Ter-9H-
 carbazole **797057-70-6P**
 (carbazole derivative, organic semiconductor device, light-emitting
 device, and electronic device)
 RN 211685-96-0 HCAPLUS
 CN 9,3':6',9''-Ter-9H-carbazole, 9'-phenyl- (9CI) (CA INDEX NAME)



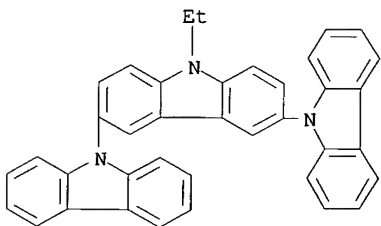
RN 606129-90-2 HCAPLUS

CN 9,3':6',9''-Ter-9H-carbazole (9CI) (CA INDEX NAME)



RN 797057-70-6 HCAPLUS

CN 9,3':6',9''-Ter-9H-carbazole, 9'-ethyl- (9CI) (CA INDEX NAME)

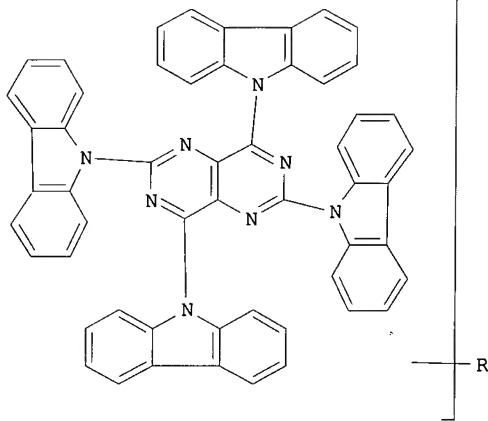


IC ICM C07D209-82
ICS C07D401-14; C07D403-14; C07D411-14; C07D413-14; C07D417-14;
C07D487-22; C09K011-06; H01L021-28; H01L029-80; H01L051-00;
H05B033-14; H05B033-22
CC 73-11 (**Optical**, Electron, and Mass Spectroscopy and
Other Related Properties)
Section cross-reference(s): 22, 76
IT **211685-96-0P 606129-90-2P**, 9,3':6',9''-Ter-9H-
carbazole **797057-70-6P**
(carbazole derivative, organic semiconductor device, light-emitting
device, and electronic device)
REFERENCE COUNT: 13 THERE ARE 13 CITED REFERENCES AVAILABLE
FOR THIS RECORD. ALL CITATIONS AVAILABLE
IN THE RE FORMAT

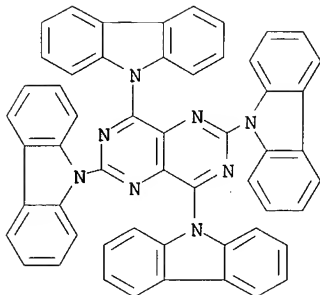
L14 ANSWER 5 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN
ACCESSION NUMBER: 2004:758812 HCAPLUS
DOCUMENT NUMBER: 141:268209
TITLE: Tetracarbazolylypyrimidopyrimidines, organic
solvent compositions containing same, and
electroluminescent devices employing same
compounds
INVENTOR(S): Ito, Kiyoshi
PATENT ASSIGNEE(S): Dainippon Printing Co., Ltd., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 13 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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JP 2004256453	A2	20040916	JP 2003-49593	2003 0226
PRIORITY APPLN. INFO.:			JP 2003-49593	2003 0226

OTHER SOURCE(S): MARPAT 141:268209
GI



- AB Claimed are tetracarbazolylpyrimidopyrimidines I (R = H, alkyl, alkenyl, alkyl ether, alkoxy, amino, etc.; R may be different when multiple R substitute). Also claimed are **electroluminescent** devices containing the compds. as **electroluminescent** materials or as charge-transport materials. Since the compds. show good solubility in organic solvents without crystallization and sublimation, **light-emitting** layers or charge-transport layers including the compds. can be prepared by wet coating process.
- IT **755043-06-2DP**, derivs.
 (tetracarbazolylpyrimidopyrimidines as light-emitting and/or charge-transport materials in organic EL devices)
- RN 755043-06-2 HCAPLUS
- CN 9H-Carbazole, 9,9',9'',9'''-pyrimido[5,4-d]pyrimidine-2,4,6,8-tetrayltetrakis- (9CI) (CA INDEX NAME)



IC ICM C07D487-04
 ICS C09K011-06; H05B033-14
 CC 73-11 (**Optical**, Electron, and Mass Spectroscopy and
 Other Related Properties)
 Section cross-reference(s): 28
 IT **755043-06-2DP**, derivs.
 (tetracarbazolylpyrimidopyrimidines as light-emitting and/or
 charge-transport materials in organic EL devices)

L14 ANSWER 6 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN
 ACCESSION NUMBER: 2004:756690 HCAPLUS
 DOCUMENT NUMBER: 141:285536
 TITLE: Organic compound and organic
 electroluminescence device
 INVENTOR(S): Okada, Masato
 PATENT ASSIGNEE(S): Dai Nippon Printing Co., Ltd., Japan
 SOURCE: PCT Int. Appl., 87 pp.
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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WO 2004078722	A1	20040916	WO 2004-JP2804	2004 0305

W: AE, AE, AG, AL, AL, AM, AM, AM, AT, AT, AU, AZ, AZ, BA,
 BB, BG, BG, BR, BR, BW, BY, BY, BZ, BZ, CA, CH, CN, CN,
 CO, CO, CR, CR, CU, CU, CZ, CZ, DE, DE, DK, DK, DM, DZ,
 EC, EC, EE, EE, EG, ES, ES, FI, FI, GB, GD, GE, GE, GH,
 GM, HR, HR, HU, HU, ID, IL, IN, IS, KE, KE, KG, KG, KP,
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 RW: BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW,
 AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR,
 HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF,
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 SN, TD, TG

JP 2004292436

A2

20041021

JP 2004-62291

2004
0305

PRIORITY APPLN. INFO.:

JP 2003-62590

A

2003
0307

JP 2004-62291

A

2004
0305

OTHER SOURCE(S): MARPAT 141:285536

AB The invention relates to an organic compound capable of realizing high luminous efficiency, whose application by coating technique is easy; and an organic **electroluminescence** device of high luminous efficiency in which the organic compound is used. In particular, the organic compound is represented by the formula: EM-X-CTM or (EM-X-CTM)-Y wherein EM represents a fluorescent material or phosphorescent material; CTM represents a charge transporting material; X represents a chemical bond chain linking EM with CTM; and Y represents a substituent for at least enhancing the solvent solubility, introduced in any of the EM, CTM and X moieties. Further, there is provided an organic **EL** device comprising at least 1 pair of facing electrodes and, interposed between the electrodes, a single or multiple organic compound layers, wherein at least 1 of the organic compound layers contains the organic compound represented by the formula: EM-X-CTM or (EM-X-CTM)-Y.

IT **757953-07-4P 757953-09-6P 757953-11-0P****757953-13-2P**

(organic compound and organic electroluminescence device)

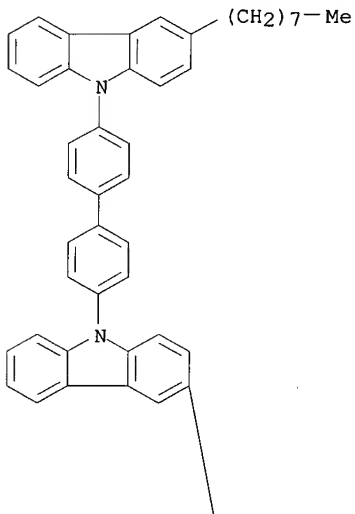
RN 757953-07-4 HCAPLUS

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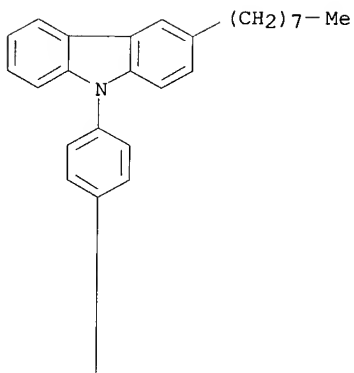
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CN Iridium, bis[4-[6-[9-[4'-(3-octyl-9H-carbazol-9-yl)[1,1'-biphenyl]-4-yl]-9H-carbazol-3-yl]hexyl]-2-(2-pyridinyl-κN)phenyl-κC](2,4-pentanedionato-κO,κO')-(9CI) (CA INDEX NAME)

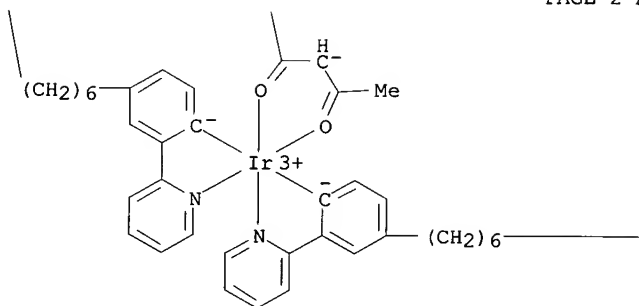
PAGE 1-A



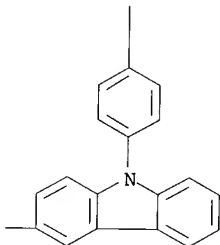
PAGE 1-B



PAGE 2-A

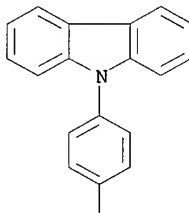
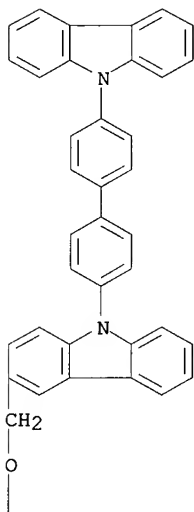


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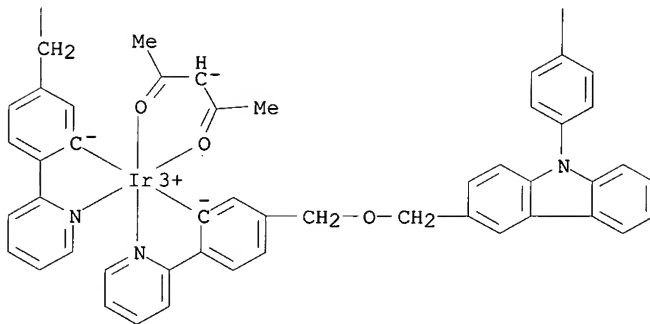


RN 757953-09-6 HCAPLUS
CN Iridium, bis[5-[[[9-[4'-(9H-carbazol-9-yl)[1,1'-biphenyl]-4-yl]-9H-carbazol-3-yl]methoxy)methyl]-2-(2-pyridinyl-κN)phenyl-κC](2,4-pentanedionato-κO,κO')- (9CI) (CA INDEX NAME)

PAGE 1-A

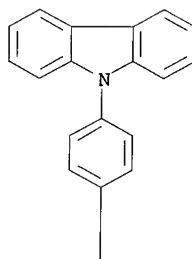
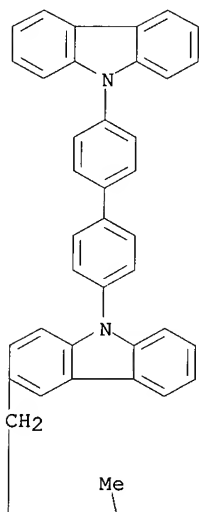


PAGE 2-A

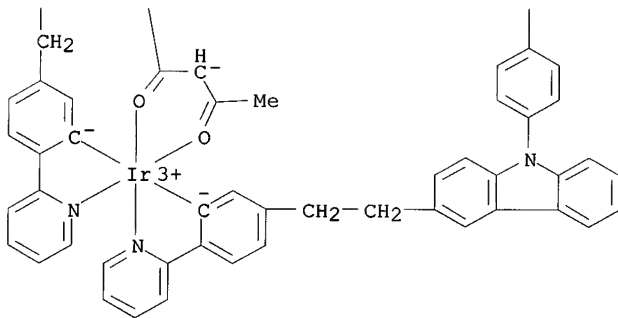


RN 757953-11-0 HCAPLUS
 CN Iridium, bis[5-[2-[9-[4'-(9H-carbazol-9-yl)[1,1'-biphenyl]-4-yl]-9H-carbazol-3-yl]ethyl]-2-(2-pyridinyl-κN)phenyl-κC](2,4-pentanedionato-κO,κO')- (9CI) (CA INDEX NAME)

PAGE 1-A

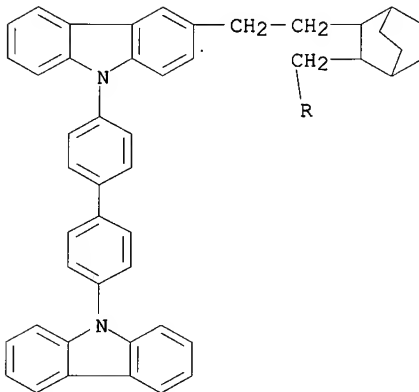


PAGE 2-A



RN 757953-13-2 HCAPLUS
 CN Iridium, bis[5-[[3-[2-[9-[4'-(9H-carbazol-9-yl)[1,1'-biphenyl]-4-yl]-9H-carbazol-3-yl]ethyl]bicyclo[2.2.2]oct-2-yl]methyl]-2-(2-pyridinyl-κN)phenyl-κC](2,4-pentanedionato-κO,κO')~ (9CI) (CA INDEX NAME)

PAGE 2-A



IC ICM C07D209-86
ICS C07D401-14; C09K011-06; H05B033-14; H05B033-22
CC 73-11 (**Optical**, Electron, and Mass Spectroscopy and
Other Related Properties)
Section cross-reference(s): 27
IT **757953-07-4P 757953-09-6P 757953-11-0P**
757953-13-2P

(organic compound and organic electroluminescence device)
REFERENCE COUNT: 7 THERE ARE 7 CITED REFERENCES AVAILABLE
FOR THIS RECORD. ALL CITATIONS AVAILABLE
IN THE RE FORMAT

L14 ANSWER 7 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN
 ACCESSION NUMBER: 2004:756324 HCAPLUS
 DOCUMENT NUMBER: 141:268203
 TITLE: Trioxanes bearing carbazolyl groups, organic
 solvent compositions containing same, and
 electroluminescent devices employing same
 compounds
 INVENTOR(S): Ito, Kiyoshi
 PATENT ASSIGNEE(S): Dainippon Printing Co., Ltd., Japan
 SOURCE: Jpn. Kokai Tokkyo Koho, 13 pp.
 CODEN: JKXXAF

DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

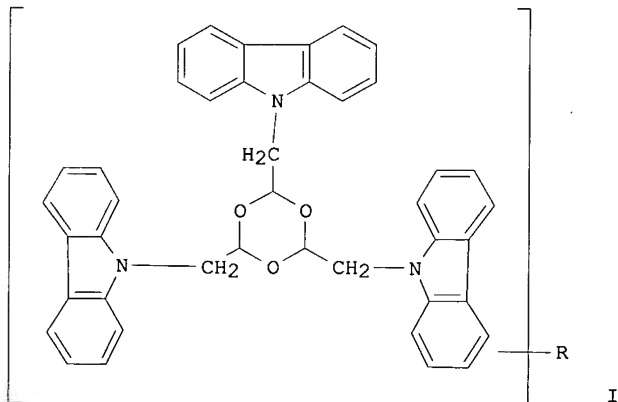
PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2004256452	A2	20040916	JP 2003-49592	2003 0226

PRIORITY APPLN. INFO.:

JP 2003-49592

2003
0226

OTHER SOURCE(S): MARPAT 141:268203
 GI



AB Claimed are carbazoyl-bearing trioxanes I (R = H, alkyl, alkenyl, alkyl ether, alkoxy, amino, etc.; R may be different when multiple R substitute). Also claimed are **electroluminescent** devices containing the compds. as **electroluminescent** materials or as charge-transport materials. Since the compds.

show good solubility in organic solvents without crystallization and sublimation,

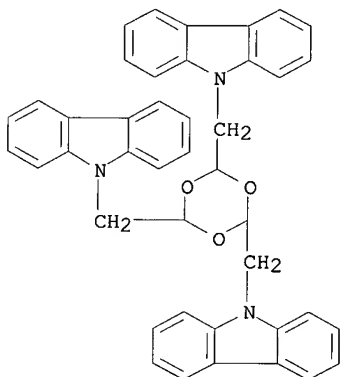
light-emitting layers or charge-transport layers including the compds. can be prepared by wet coating process.

IT **755043-05-1P**

(carbazolyl-bearing trioxanes as light-emitting and/or charge-transport materials in organic EL devices)

RN 755043-05-1 HCAPLUS

CN 9H-Carbazole, 9,9',9''-[1,3,5-trioxane-2,4,6-triyltris(methylene)]tris- (9CI) (CA INDEX NAME)



IC ICM C07D405-14

ICS C09K011-06; H05B033-14

CC 73-11 (**Optical**, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 28

IT **755043-05-1P**

(carbazolyl-bearing trioxanes as light-emitting and/or charge-transport materials in organic EL devices)

L14 ANSWER 8 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2004:753399 HCAPLUS

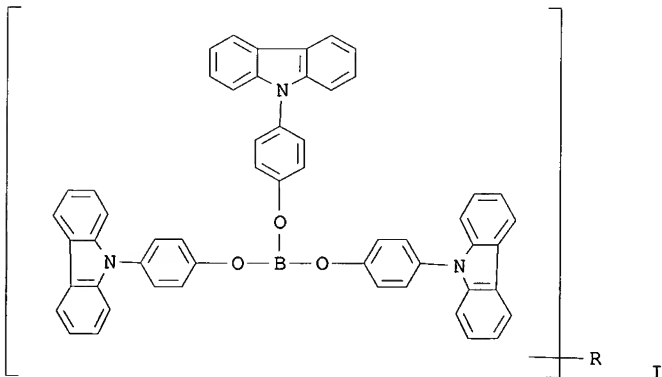
DOCUMENT NUMBER: 141:268196

TITLE: Tris[4-(N-carbazolyl)phenyl] borates, their compositions, and organic electroluminescent

INVENTOR(S): devices
Ito, Kiyoshi
PATENT ASSIGNEE(S): Dainippon Printing Co., Ltd., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 12 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
----- JP 2004256455	A2	20040916	JP 2003-49595	2003 0226
PRIORITY APPLN. INFO.:			JP 2003-49595	2003 0226

OTHER SOURCE(S): MARPAT 141:268196
GI



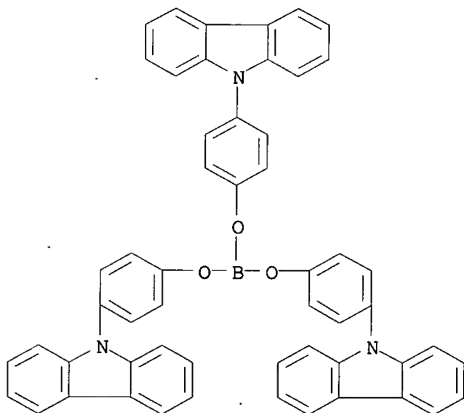
AB Title compds. are I (R = H, alkyl, alkenyl, etc.). The compds. have low crystallinity and sublimation property, resulting in economical formation of films by wet process using solvents. Thus, I (R = H) was manufactured from carbazole and tris(4-chlorophenyl) borate, and used for an emitter layer or a charge-transporting layer for an organic **electroluminescent** device.

IT **756526-60-0P**

(manufacture of tris[(N-carbazolyl)phenyl] borates for organic electroluminescent devices)

RN 756526-60-0 HCAPLUS

CN Phenol, 4-(9H-carbazol-9-yl)-, triester with boric acid (H3BO3) (9CI) (CA INDEX NAME)



IC ICM C07F005-04

ICS C09K011-06; H05B033-14; H05B033-22

CC 73-11 (**Optical**, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 29

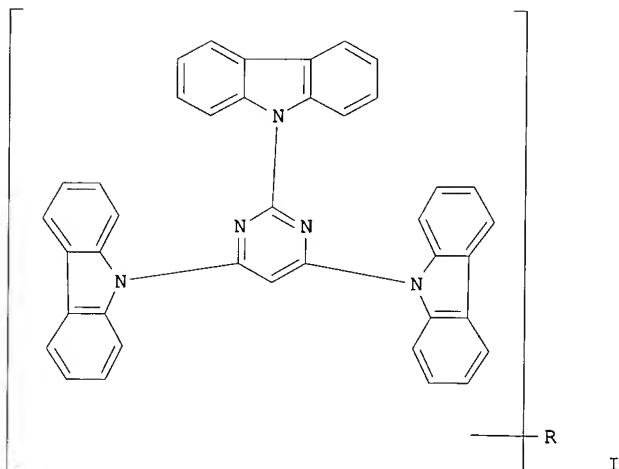
IT **756526-60-0P**

(manufacture of tris[(N-carbazolyl)phenyl] borates for organic electroluminescent devices)

L14 ANSWER 9 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN
ACCESSION NUMBER: 2004:753398 HCAPLUS
DOCUMENT NUMBER: 141:268195
TITLE: Tricarbazolylypyrimidines, organic solvent
compositions containing same, and
electroluminescent devices employing same
compounds
INVENTOR(S): Ito, Kiyoshi
PATENT ASSIGNEE(S): Dainippon Printing Co., Ltd., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 13 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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JP 2004256451	A2	20040916	JP 2003-49591	2003 0226
PRIORITY APPLN. INFO.:			JP 2003-49591	2003 0226

OTHER SOURCE(S): MARPAT 141:268195
GI



AB Claimed are tricarbazolylpyrimidines I (R = H, alkyl, alkenyl, alkyl ether, alkoxy, amino, etc.; R may be different when multiple R substitute). Also claimed are **electroluminescent** devices containing the compds. as **electroluminescent** materials or as charge-transport materials. Since the compds. show good solubility in organic solvents without crystallization and sublimation,

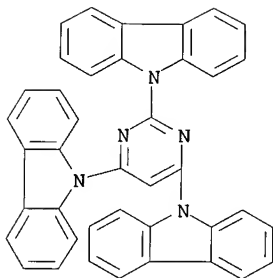
light-emitting layers or charge-transport layers including the compds. can be prepared by wet coating process.

IT **699119-36-3DP**, derivs.

(tricarbazolylpyrimidines as light-emitting and/or charge-transport materials in organic EL devices)

RN 699119-36-3 HCAPLUS

CN 9H-Carbazole, 9,9',9''-(2,4,6-pyrimidinetriyl)tris- (9CI) (CA INDEX NAME)



IC ICM C07D403-14
ICS C09K011-06; H05B033-14
CC 73-11 (**Optical**, Electron, and Mass Spectroscopy and
Other Related Properties)
Section cross-reference(s): 28
IT **699119-36-3DP**, derivs.
(tricarbazolylpyrimidines as light-emitting and/or
charge-transport materials in organic EL devices)

L14 ANSWER 10 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN
ACCESSION NUMBER: 2004:739385 HCAPLUS
DOCUMENT NUMBER: 141:268179
TITLE: Long-life white-emitting organic
electroluminescent devices, displays,
illumination apparatus, and electric
appliances therewith
INVENTOR(S): Fukuda, Mitsuhiro; Genda, Kazuo
PATENT ASSIGNEE(S): Konica Minolta Holdings, Inc., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 577 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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JP 2004253298	A2	20040909	JP 2003-43860	2003

USHA SHRESTHA REM 4B28

PRIORITY APPLN. INFO.:

JP 2003-43860

0221

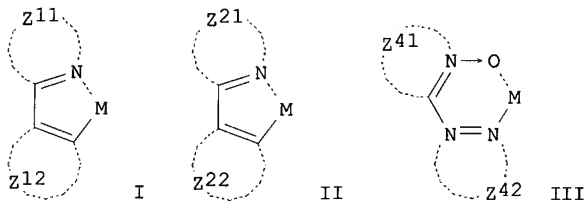
2003

0221

OTHER SOURCE(S):

MARPAT 141:268179

GI



AB The devices have, in their constituent layers (e.g., emitting layers, hole- or electron-transporting layers), (i) compds. represented by $X1R1C:CR2X2$ [$X1, X2$ = aryl, heterocycle; $R1, R2$ = aryl, heterocyclic hydrocarbyl, cycloalkoxy ($R1 = R2$ = aryl)], $R11R12R13R14R15P$ ($R11-R15$ = monovalent substituent), $Ar2Ar1C6H4(m-Ar1Ar2)$ [$Ar1$ = bivalent aromatic hydrocarbylene; $Ar2$ = (substituted) Ph; H atom on the benzene ring may be substituted with (cyclo)alkyl, alkoxy, or halo], $Z(ArQ)n$ [Q = (substituted) o-(2-pyridyl)phenyl; Z = n-valent bridging group, single bond; Ar = bivalent arylene; n = 2-8], etc., (ii) fluorescent compds. with mol. weight 500-2000 and atomic ratio $F/(F + H)$ 0-0.9 and having fluorescent peak at ≤ 415 nm, (iii) polysilanes $(R21R22Si)n$ [$R21, R22$ = alkyl(oxy), aromatic group, aryloxy; $n1 \geq 3$] or $[R31(Ar31NR32R33)Si]n$ [$R31$ = alkyl(oxy), aromatic group, aryloxy; $R32, R33$ = alkyl, aromatic group; $Ar31$ = arylene; $n2 \geq 3$], and/or (iv) fluorescent compds. satisfying atomic ratio N/C 0-0.05. The devices, having phosphorescent dopants I ($Z11$ = aromatic azacycle; $Z12$ = nonarom. ring, 5-membered aromatic ring, azulene; M = metal), II ($Z21, Z22$ = aromatic azacycle; M = metal), or III ($Z41$ = azacycle; $Z42$ = ring; M = metal) in emitting layers, are also claimed. The devices exhibit high luminescent efficiency and substantially white emission, and are suited for light source uses, especially of LCD.

IT 643758-09-2 643758-10-5 643758-15-0

669072-72-4 705941-97-5 705942-24-1

722547-84-4 722547-85-5 722547-86-6

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754231-82-8 754231-87-3

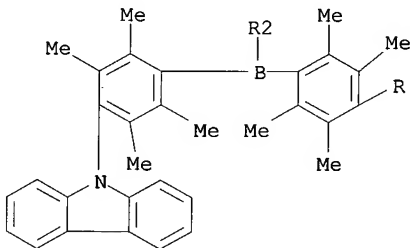
(long-life white-emitting organic **LED** containing azacyclic phosphorescent dopants and showing high luminescent efficiency)

RN
CN

643758-09-2 HCAPLUS

9H-Carbazole, 9,9',9''-[borylidynetris(2,3,5,6-tetramethyl-4,1-phenylene)]tris- (9CI) (CA INDEX NAME)

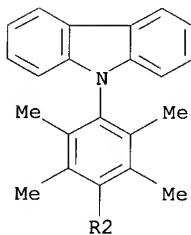
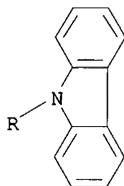
PAGE 1-A



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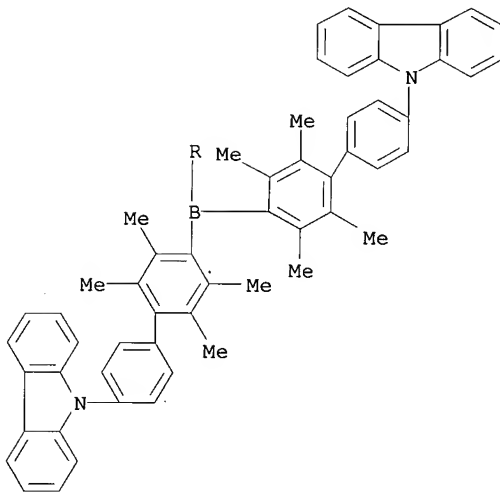
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PAGE 2-A

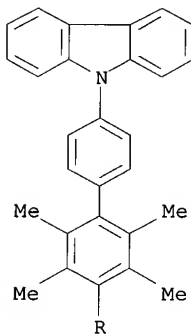


RN 643758-10-5 HCAPLUS
CN 9H-Carbazole, 9,9',9''-[borylidynetris(2',3',5',6'-
tetramethyl[1,1'-biphenyl]-4',4-diyl)]tris- (9CI) (CA INDEX NAME)

PAGE 1-A

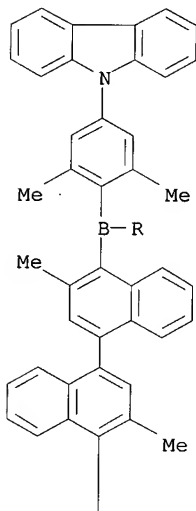


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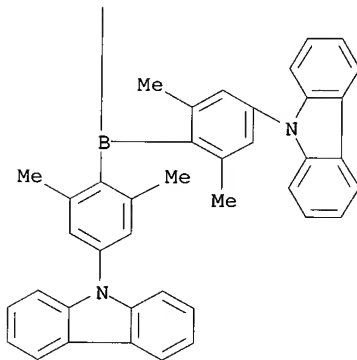


RN 643758-15-0 HCAPLUS
CN 9H-Carbazole, 9,9',9'',9'''-[(3,3'-dimethyl[1,1'-binaphthalene]-4,4'-diyl)bis[borylidynebis(3,5-dimethyl-4,1-phenylene)]]tetrakis-(9CI) (CA INDEX NAME)

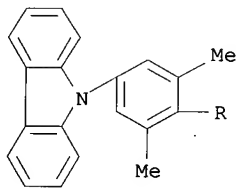
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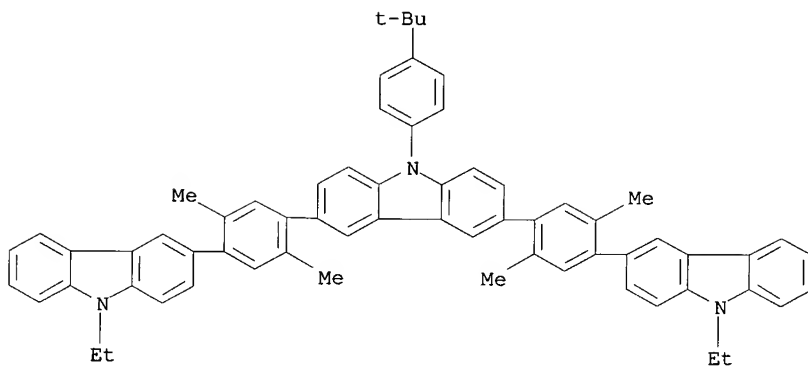
PAGE 2-A



PAGE 3-A

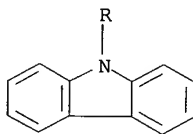
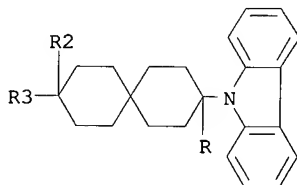


RN 669072-72-4 HCAPLUS
CN 9H-Carbazole, 9-[4-(1,1-dimethylethyl)phenyl]-3,6-bis[4-(9-ethyl-9H-carbazol-3-yl)-2,5-dimethylphenyl]- (9CI) (CA INDEX NAME)



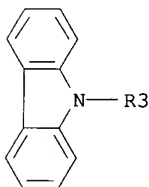
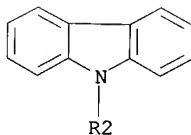
RN 705941-97-5 HCAPLUS
CN 9H-Carbazole, 9,9',9'',9'''-spiro[5.5]undecane-3,9-diylidenetetrakis- (9CI) (CA INDEX NAME)

PAGE 1-A



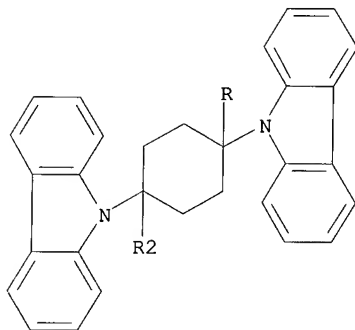
USHA SHRESTHA REM 4B28

PAGE 2-A

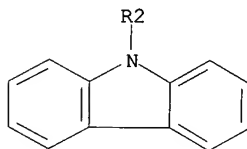
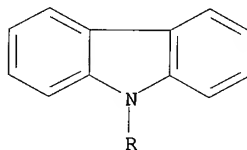


RN 705942-24-1 HCAPLUS
CN 9H-Carbazole, 9,9',9'',9'''-(1,4-cyclohexanediylidene)tetrakis-
(9CI) (CA INDEX NAME)

PAGE 1-A

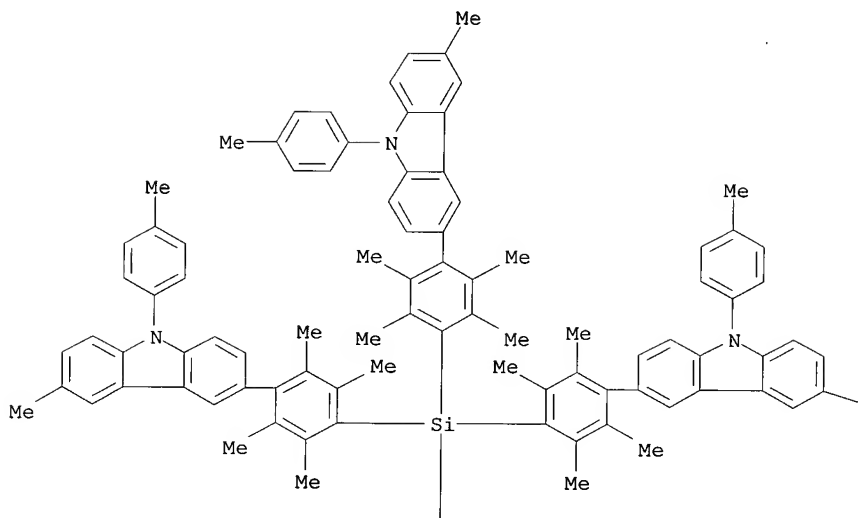


PAGE 2-A



RN 722547-84-4 HCAPLUS
 CN 9H-Carbazole, 3,3',3'',3'''-[silanetetrayltetrakis(2,3,5,6-tetramethyl-4,1-phenylene)]tetrakis[6-methyl-9-(4-methylphenyl)-(9CI) (CA INDEX NAME)

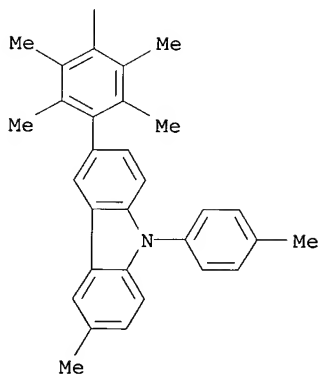
PAGE 1-A



PAGE 1-B

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PAGE 2-A

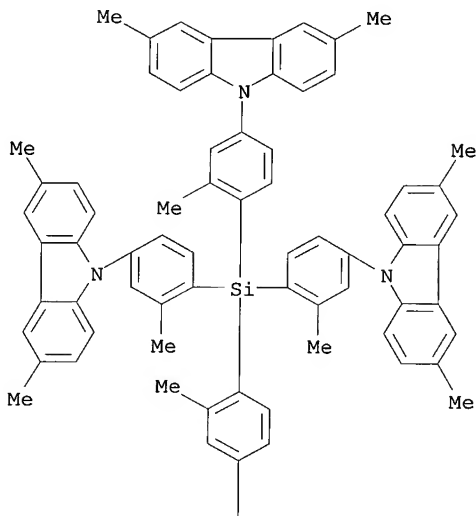


RN 722547-85-5 HCAPLUS

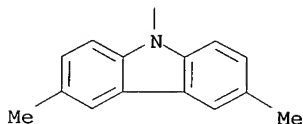
USHA SHRESTHA REM 4B28

CN 9H-Carbazole, 9,9',9'',9'''-[silanetetrayltetrakis(3-methyl-4,1-phenylene)]tetrakis[3,6-dimethyl- (9CI) (CA INDEX NAME)

PAGE 1-A



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RN 722547-86-6 HCAPLUS

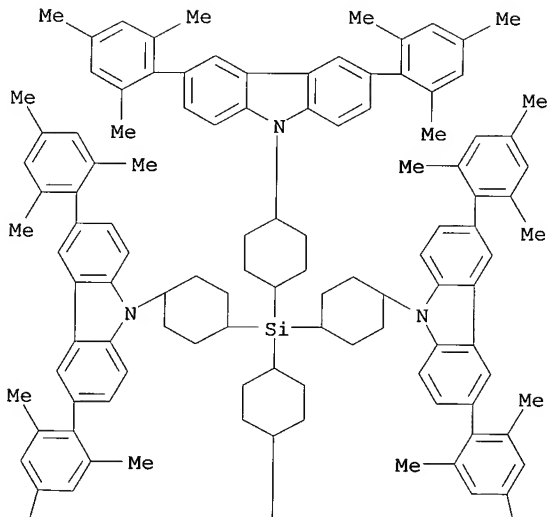
CN 9H-Carbazole, 9,9',9'',9'''-(silanetetrayltetra-4,1-cyclohexanediyl)tetrakis[3,6-bis(2,4,6-trimethylphenyl)- (9CI)

USHA SHRESTHA

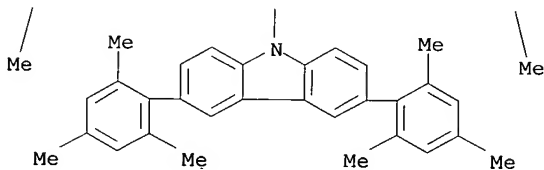
REM 4B28

(CA INDEX NAME)

PAGE 1-A

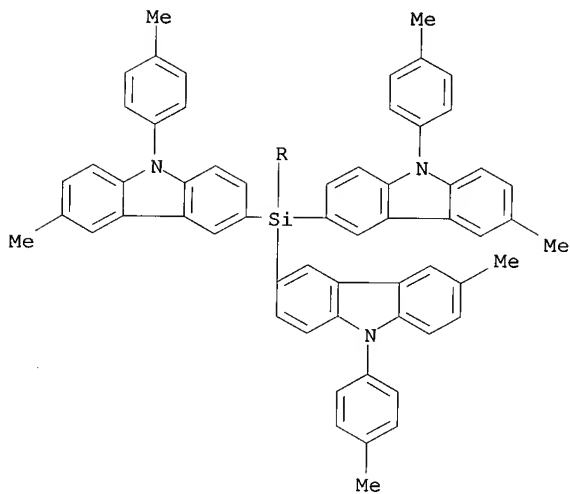


PAGE 2-A

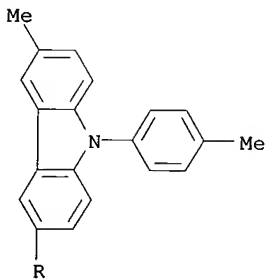


RN 722547-87-7 HCAPLUS
CN 9H-Carbazole, 3,3',3'',3'''-silanetetrayltetrakis[6-methyl-9-(4-methylphenyl)- (9CI) (CA INDEX NAME)

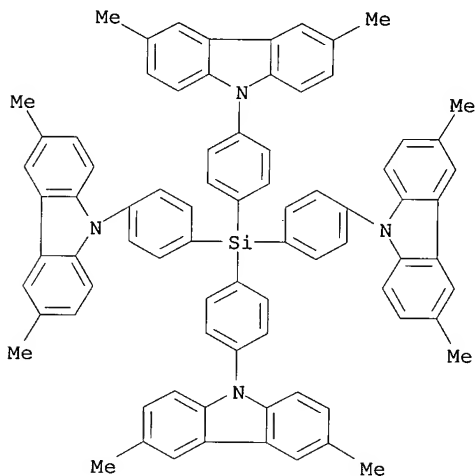
PAGE 1-A



PAGE 2-A

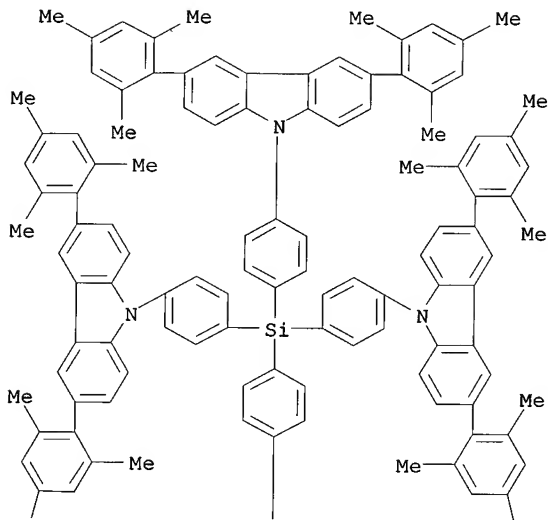


RN 722547-88-8 HCAPLUS
CN 9H-Carbazole, 9,9',9'',9'''-(silanetetrayltetra-4,1-phenylene)tetrakis[3,6-dimethyl- (9CI) (CA INDEX NAME)

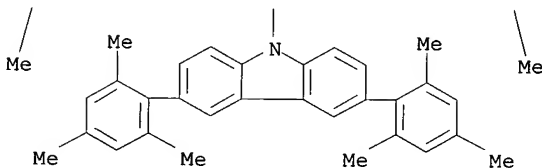


RN 722547-89-9 HCAPLUS
CN 9H-Carbazole, 9,9',9'',9'''-(silanetetrayltetra-4,1-phenylene)tetrakis[3,6-bis(2,4,6-trimethylphenyl)- (9CI) (CA INDEX NAME)

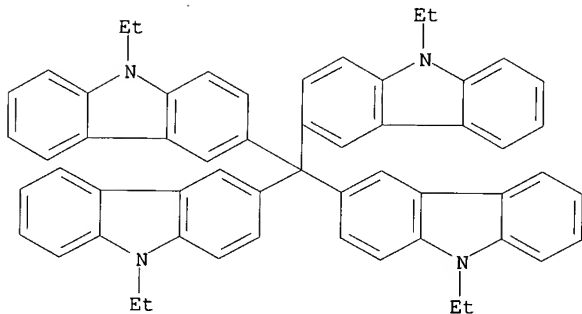
PAGE 1-A



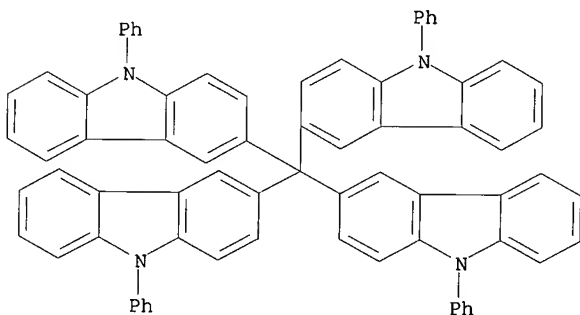
PAGE 2-A



RN 754231-82-8 HCAPLUS
CN 9H-Carbazole, 3,3',3'',3'''-methanetetrayltetrakis[9-ethyl- (9CI)
(CA INDEX NAME)



RN 754231-87-3 HCAPLUS
 CN 9H-Carbazole, 3,3',3'',3'''-methanetetrayltetrakis[9-phenyl- (9CI)
 (CA INDEX NAME)



IC ICM H05B033-14
 ICS C09K011-06; G02F001-1335; H05B033-22
 CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related
 Properties)
 Section cross-reference(s): 25, 28, 29, 38, 74
 IT 71-43-2, Benzene, uses 159-68-2, 9,9'-Spirobi[9H-9-silafluorene]
 346-02-1 752-28-3 1423-70-7 17742-49-3 18822-13-4
 20156-53-0 32314-41-3 33861-11-9 35088-77-8 38186-32-2

54765-15-0	65181-79-5	122107-04-4	133942-93-5	139376-06-0
142289-08-5	203070-80-8	213621-16-0	219917-71-2	
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694534-34-4	694534-41-3	694534-43-5	694534-44-6	
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705973-82-6	722547-84-4	722547-85-5		
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722547-89-9	754231-79-3	754231-80-6		

754231-82-8 754231-83-9 754231-84-0
 754231-87-3 754231-88-4 754231-89-5 754231-90-8
 754231-91-9 754231-92-0 754231-94-2

(long-life white-emitting organic **LED** containing azacyclic phosphorescent dopants and showing high luminescent efficiency)

L14 ANSWER 11 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2004:718614 HCAPLUS

DOCUMENT NUMBER: 141:251178

TITLE: Organic materials for electroluminescent device showing high luminous efficiency

INVENTOR(S): Tomita, Seiji; Iwakuma, Toshihiro; Arakane, Takashi; Yamamichi, Keiko; Hosokawa, Chishio

PATENT ASSIGNEE(S): Idemitsu Kosan Co., Ltd., Japan

SOURCE: PCT Int. Appl., 71 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2004074399	A1	20040902	WO 2004-JP1796	2004 0218

W: AE, AE, AG, AL, AL, AM, AM, AM, AT, AT, AU, AZ, AZ, BA, BB, BG, BG, BR, BR, BW, BY, BY, BZ, BZ, CA, CH, CN, CN, CO, CO, CR, CR, CU, CU, CZ, CZ, DE, DE, DK, DK, DM, DZ, EC, EC, EE, EE, EG, ES, ES, FI, FI, GB, GD, GE, GE, GH, GM, HR, HR, HU, HU, ID, IL, IN, IS, JP, JP, KE, KE, KG, KG, KP, KP, KP, KR, KR, KZ, KZ, KZ, LC, LK, LR, LS, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MX, MZ, MZ, NA, NI

RW: BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

PRIORITY APPLN. INFO.:

JP 2003-42625

A

2003
0220

USHA SHRESTHA

REM 4B28

JP 2003-387855

A

2003

1118

OTHER SOURCE(S): MARPAT 141:251178

AB The invention relates to an organic **electroluminescent** device material composed of a low-symmetry compound having a specific structure represented by (Cz)c(Ar4)bAr3(Ar1)aAr2 (Cz: selected from carbazoyl, arylcarbazoyl of C18-C60, azacarbazoyl, acrylazacarbazoyl of C18-C60, acridinyl etc.; Ar1 and Ar2: selected from substituted or non-substituted aryl of C6-C60 or heterocyclic ring of C3-C60; Ar3: selected from heterocyclic ring of C3-C60; Ar4: selected from substituted or non-substituted benzene residue etc.; a:0-1; b:0-4; c:1-3). An organic **electroluminescent** device comprising an organic thin film layer which is interposed between a cathode and an anode and composed of one or more layers including at least a **light emitting** layer is also disclosed. At least one layer of the organic thin film layer of this device contains the above-described material for organic **electroluminescent** devices, which material enables to provide organic **electroluminescent** devices having high luminous efficiency, no pixel defect, and excellent heat resistance.

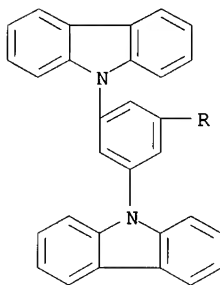
IT 750573-34-3p

(organic materials for electroluminescent device having high luminous efficiency)

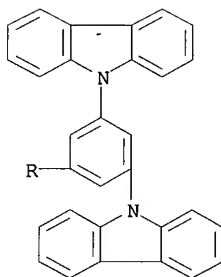
RN 750573-34-3 HCAPLUS

CN 9H-Carbazole, 9,9',9'',9'''-[1,1'-biphenyl]-3,3',5,5'-tetrayltetrakis- (9CI) (CA INDEX NAME)

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IC ICM C09K011-06

ICS H05B033-14

CC 73-11 (**Optical**, Electron, and Mass Spectroscopy and
Other Related Properties)

Section cross-reference(s): 27, 28, 76

IT 750573-25-2P 750573-27-4P 750573-29-6P 750573-33-2P

750573-34-3P(organic materials for electroluminescent device having high
luminous efficiency)

REFERENCE COUNT: 24 THERE ARE 24 CITED REFERENCES AVAILABLE
FOR THIS RECORD. ALL CITATIONS AVAILABLE
IN THE RE FORMAT

L14 ANSWER 12 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN
ACCESSION NUMBER: 2004:698199 HCAPLUS
DOCUMENT NUMBER: 141:232971
TITLE: Carbazole compounds and use of such compounds
in organic electroluminescent devices
INVENTOR(S): Brunner, Klemens; De Kok-Van Breemen,
Margaretha M.; Langeveld, Bea M. W.; Kiggen,
Nicole M. M.; Bastiaansen, Jolanda J. A. M.;
Hofstraat, Johannes W.; Boerner, Herbert F.;
Schoo, Hermannus F. M.
PATENT ASSIGNEE(S): Koninklijke Philips Electronics N.V., Neth.
SOURCE: PCT Int. Appl., 56 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 3
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2004072205	A2	20040826	WO 2004-IB50049	

2004
0123

WO 2004072205 A3 20040916

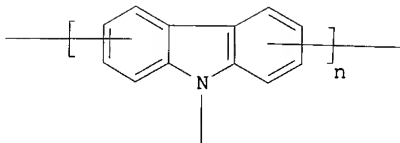
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CO, CO, CR, CR, CU, CU, CZ, CZ, DE, DE, DK, DK, DM, DZ,
EC, EC, EE, EE, EG, ES, ES, FI, FI, GB, GD, GE, GE, GH,
GM, HR, HR, HU, HU, ID, IL, IN, IS, JP, JP, KE, KE, KG,
KG, KP, KP, KP, KR, KR, KZ, KZ, KZ, LC, LK, LR, LS, LS,
LT, LU, LV, MA, MD, MD, MG, MK, MN, MW, MX, MX, MZ, MZ,
NA, NI
RW: BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW,
AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR,
HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ,
CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG,
TD, TG

PRIORITY APPLN. INFO.: NL 2003-1022660 A 2003

USHA SHRESTHA REM 4B28

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I

AB Carbazole compds., polymeric or of low mol. weight, are described which comprise a carbazole multimer unit are described by the general formula I ($n \geq 2$) wherein each carbazole unit may be unsubstituted or substituted with ≥ 1 substituents. Combinations of the with a **light-emitting** compound, especially a triplet emitter, capable of accepting energy

from

the carbazole compound are also described.

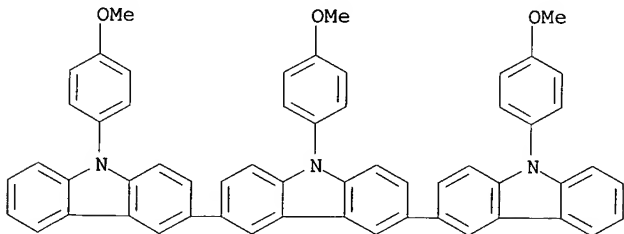
Electroluminescent devices are described which employ the carbazole compds. or the combinations.

IT **714972-57-3P**

(oligomeric or polymeric carbazole compds. and luminescent compns. containing them and electroluminescent devices using them)

RN 714972-57-3 HCAPLUS

CN 3,3':6',3''-Ter-9H-carbazole, 9,9',9''-tris(4-methoxyphenyl)-
(9CI) (CA INDEX NAME)



IC ICM C09K011-06
ICS H01L051-30; C08G073-06; C08L079-04; H05B033-14; H01B001-12;
C07D209-82
CC 73-11 (**Optical**, Electron, and Mass Spectroscopy and
Other Related Properties)
Section cross-reference(s): 27, 76
IT 57102-48-4P **714972-57-3P**
(oligomeric or polymeric carbazole compds. and luminescent
compns. containing them and electroluminescent devices using them)

L14 ANSWER 13 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2004:519756 HCAPLUS

DOCUMENT NUMBER: 141:197088

TITLE: Molecular hosts for triplet emission in light
emitting diodes: a quantum-chemical study

AUTHOR(S): Marsal, P.; Aivilov, I.; da Silva Filho, D. A.;
Bredas, J. L.; Beljonne, D.

CORPORATE SOURCE: Laboratory for Chemistry of Novel Materials,
Center for Research on Service de Chemie des
Matesuena, University of Mons-Hainaut, Mons,
B-7000, Belg.

SOURCE: Chemical Physics Letters (2004), 392(4-6),
521-528

CODEN: CHPLBC; ISSN: 0009-2614

PUBLISHER: Elsevier Science B.V.

DOCUMENT TYPE: Journal

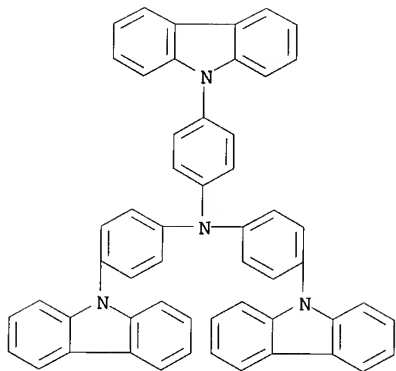
LANGUAGE: English

AB Correlated semiempirical and ab initio quantum-chemical methods are
applied to the description of the lowest-lying triplet excited
state, T1, in conjugated mols. used as hosts in phosphorescent
light emitting diodes. D. functional theory leads to the best
agreement between measured and calculated excitation energies in a set
of reference mols. The trade-off between the barrier for charge
injection and the singlet-triplet S0 → T1 energy spacing is
discussed in the context of the design of mol. hosts for blue
triplet guest emitters.

IT **139092-78-7**
(mol. host for triplet emission in **LEDs** quantum chemical
study)

RN 139092-78-7 HCAPLUS

CN Benzenamine, 4-(9H-carbazol-9-yl)-N,N-bis[4-(9H-carbazol-9-
yl)phenyl]- (9CI) (CA INDEX NAME)



CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 76

IT 603-34-9, Triphenylamine 1150-62-5, 9H-Carbazole, 9-phenyl-
 1484-12-4, 9H-Carbazole, 9-methyl- 4733-39-5, BCP 46498-17-3
 58246-82-5 58328-31-7, CBP 65181-78-4, TPD (photoreceptor)
 69297-87-6 **139092-78-7** 224820-82-0 604785-54-8,
 9H-Carbazole, 9,9'-[2,2'-dimethyl-1,1'-biphenyl]-4,4'-diylbis-
 740839-92-3 740839-93-4 740839-94-5
 (mol. host for triplet emission in **LEDs** quantum chemical
 study)

REFERENCE COUNT: 35 THERE ARE 35 CITED REFERENCES AVAILABLE
 FOR THIS RECORD. ALL CITATIONS AVAILABLE
 IN THE RE FORMAT

L14 ANSWER 14 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2004:493169 HCAPLUS

DOCUMENT NUMBER: 141:61824

TITLE: Organic electroluminescence device and display
 INVENTOR(S): Oshiyama, Tomohiro; Yamada, Taketoshi; Kita,
 Hiroshi

PATENT ASSIGNEE(S): Konica Minolta Holdings Inc., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 38 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

USHA SHRESTHA REM 4B28

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2004171860	A2	20040617	JP 2002-334908	

2002
1119

PRIORITY APPLN. INFO.:

JP 2002-334908

2002
1119

OTHER SOURCE(S): MARPAT 141:61824

AB The invention relates to a phosphorescent organic **electroluminescent** device comprising an **electroluminescent** layer host material represented by $X1-(A1)_n$ [$X1$ = nonarom. linking group; $A1$ = carbazole derivs.; n = 1-4 integer], and a hole-blocking layer made of a substance selected from styryl, triazole, phenanthroline, oxadiazol, and boron compound derivs.

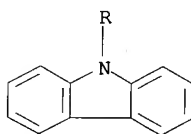
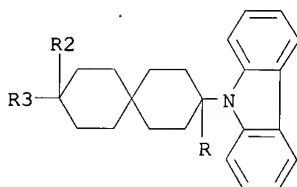
IT 705941-97-5P

(phosphorescent organic electroluminescence device)

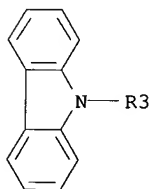
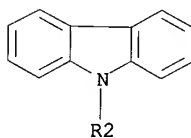
RN 705941-97-5 HCAPLUS

CN 9H-Carbazole, 9,9',9'',9'''-spiro[5.5]undecane-3,9-diylidenetetrakis- (9CI) (CA INDEX NAME)

PAGE 1-A



PAGE 2-A

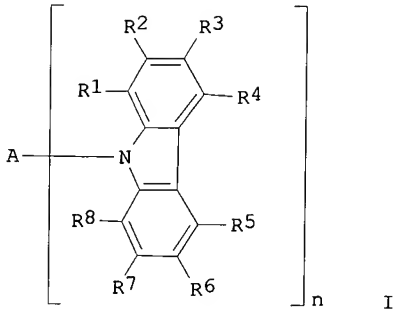


IC ICM H05B033-14
ICS C09K011-06; H05B033-22; C07D209-86
CC 73-11 (**Optical**, Electron, and Mass Spectroscopy and
Other Related Properties)
IT 705941-83-9P **705941-97-5P**
(phosphorescent organic electroluminescence device)

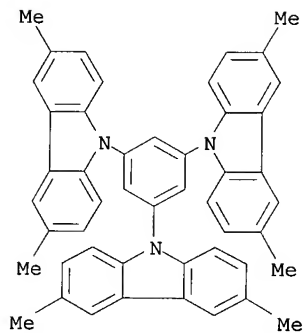
L14 ANSWER 15 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN
ACCESSION NUMBER: 2004:493154 HCAPLUS
DOCUMENT NUMBER: 141:61823
TITLE: Organic electroluminescent device and display
INVENTOR(S): Fukuda, Mitsuhiro; Yamada, Taketoshi; Kita,
Hiroshi
PATENT ASSIGNEE(S): Konica Minolta Holdings Inc., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 35 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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JP 2004171808	A2	20040617	JP 2002-333320	2002 1118
PRIORITY APPLN. INFO.:			JP 2002-333320	2002 1118

OTHER SOURCE(S): MARPAT 141:61823
GI

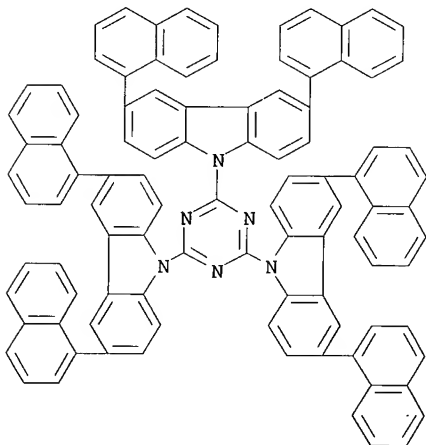


- AB The invention relates to an organic **electroluminescent** device and display, especially a phosphorescent **electroluminescence** device, comprising the carbazole derivative represented by I [A = aromatic ring residue; R1-8 = H and substituted group (at least one of R1-8 is a substituted group other than H); n = ≥ 1 integer].
- IT **705280-81-5P 705280-83-7P**
(phosphorescent organic electroluminescent device and display)
- RN 705280-81-5 HCAPLUS
- CN 9H-Carbazole, 9,9',9''-(1,3,5-benzenetriyl)tris[3,6-dimethyl-(9CI) (CA INDEX NAME)]



RN 705280-83-7 HCAPLUS

CN 9H-Carbazole, 9,9',9''-(1,3,5-triazine-2,4,6-triyl)tris[3,6-di-1-naphthalenyl- (9CI) (CA INDEX NAME)



IC ICM H05B033-14
 ICS C09K011-06
 CC 73-11 (**Optical**, Electron, and Mass Spectroscopy and
 Other Related Properties)
 Section cross-reference(s): 74
 IT **705280-81-5P 705280-83-7P**
 (phosphorescent organic electroluminescent device and display)

L14 ANSWER 16 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN
 ACCESSION NUMBER: 2004:473163 HCAPLUS
 DOCUMENT NUMBER: 141:30891
 TITLE: Organic electroluminescent device and display
 INVENTOR(S): Fukuda, Mitsuhiro; Kita, Hiroshi; Yamada,
 Taketoshi
 PATENT ASSIGNEE(S): Japan
 SOURCE: U.S. Pat. Appl. Publ., 37 pp.
 CODEN: USXXCO
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2004110031	A1	20040610	US 2003-718360	2003 1120
JP 2004178895	A2	20040624	JP 2002-342192	2002 1126
PRIORITY APPLN. INFO.:			JP 2002-342192	A 2002 1126

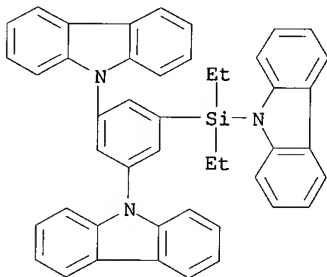
OTHER SOURCE(S): MARPAT 141:30891
 AB Disclosed is an organic **electroluminescent** device
 comprising a component layer including a **light**
emission layer, wherein the **light**
emission layer contains a phosphorescent compound, and the
 component layer contains a compound represented by A-(Z)n, [A =
 (un)substituted aromatic ring residue; n = 3-6 integer; and Z =
 monovalent organic group represented by -L-Cz, [L = chemical bond and
 divalent linking group; Cz = (un)substituted carbazole residue],
 provided that A-(Z)n does not have an n-fold axis of symmetry].

IT 699119-91-0P

(org. electroluminescent device and display having light emitting layer containing phosphorescent substance)

RN 699119-91-0 HCAPLUS

CN 9H-Carbazole, 9,9'-[5-(9H-carbazol-9-yl-diethylsilyl)-1,3-phenylene]bis- (9CI) (CA INDEX NAME)



IT 699119-36-3P 699119-40-9P 699119-44-3P

699119-49-8P 699119-54-5P 699119-58-9P

699119-61-4P 699119-65-8P 699119-69-2P

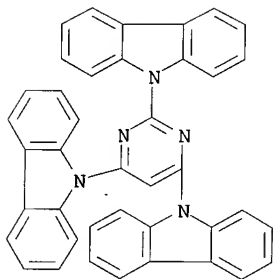
699119-73-8P 699119-77-2P 699119-81-8P

699119-86-3P 699119-96-5P 699120-00-8P

(organic electroluminescent device and display having light emitting layer containing phosphorescent substance)

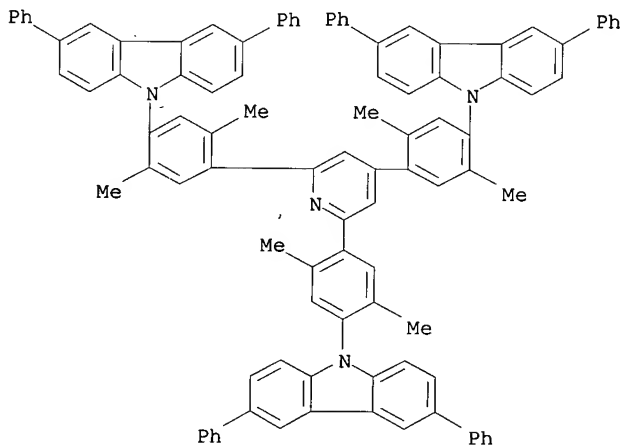
RN 699119-36-3 HCAPLUS

CN 9H-Carbazole, 9,9',9''-(2,4,6-pyrimidinetriyl)tris- (9CI) (CA INDEX NAME)



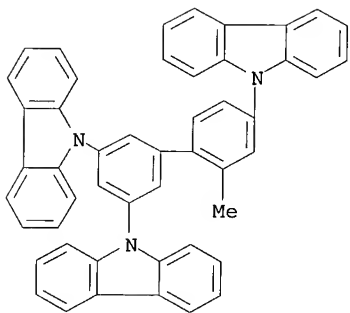
RN 699119-40-9 HCAPLUS

CN 9H-Carbazole, 9,9',9''-[2,4,6-pyridinetriyltris(2,5-dimethyl-4,1-phenylene)]tris(3,6-diphenyl- (9CI) (CA INDEX NAME)

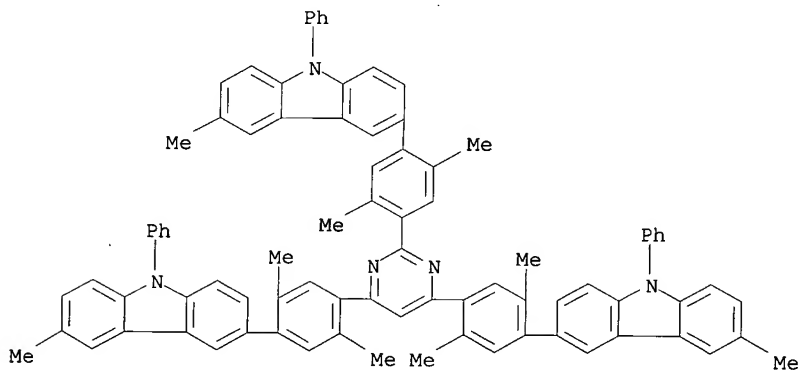


RN 699119-44-3 HCAPLUS

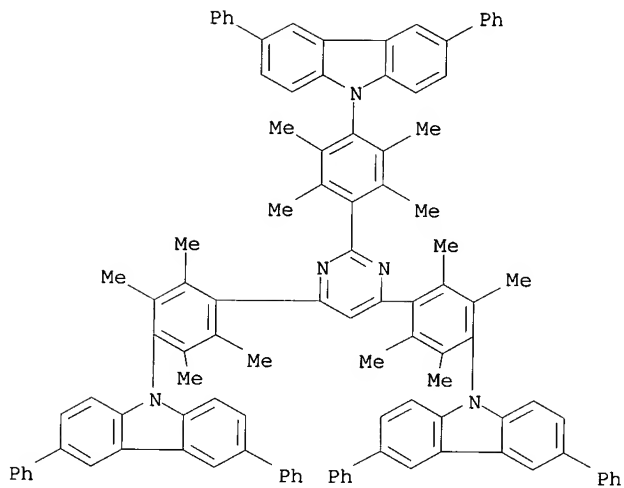
CN 9H-Carbazole, 9,9',9''-[2'-methyl[1,1'-biphenyl]-3,4',5-triyl]tris- (9CI) (CA INDEX NAME)



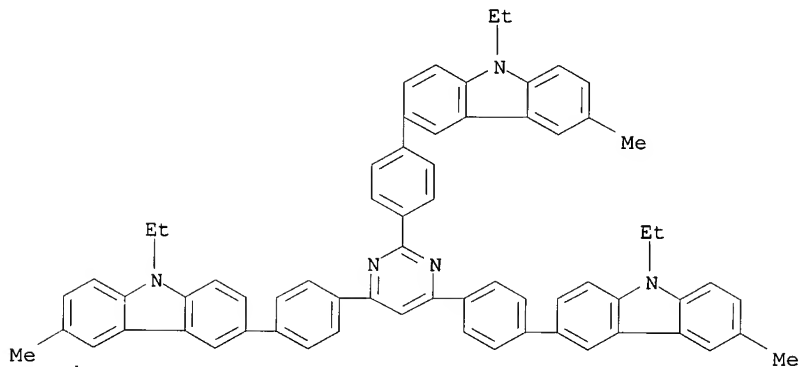
RN 699119-49-8 HCAPLUS
 CN 9H-Carbazole, 3,3',3''-[2,4,6-pyrimidinetriyl]tris(2,5-dimethyl-4,1-phenylene)tris[6-methyl-9-phenyl- (9CI) (CA INDEX NAME)



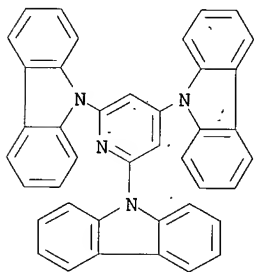
RN 699119-54-5 HCAPLUS
 CN 9H-Carbazole, 9,9',9''-[2,4,6-pyrimidinetriyl]tris(2,3,5,6-tetramethyl-4,1-phenylene)tris[3,6-diphenyl- (9CI) (CA INDEX NAME)



RN 699119-58-9 HCAPLUS
CN 9H-Carbazole, 3,3',3''-(2,4,6-pyrimidinetriyltri-4,1-phenylene)tris[9-ethyl-6-methyl- (9CI) (CA INDEX NAME)



RN 699119-61-4 HCAPLUS
 CN 9H-Carbazole, 9,9',9''-(2,4,6-pyridinetriyl)tris- (9CI) (CA INDEX NAME)

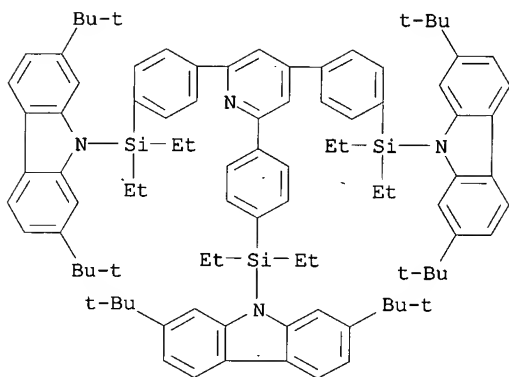


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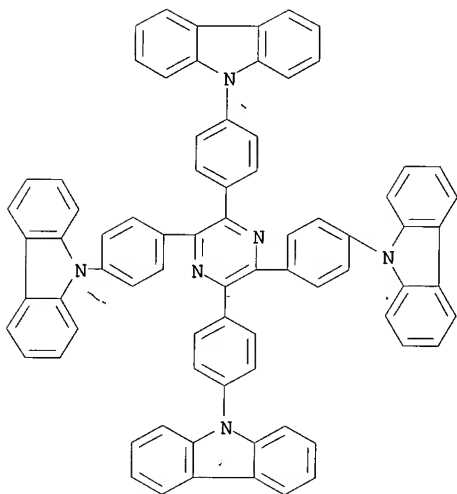
RN 699119-65-8 HCAPLUS
 CN 9H-Carbazole, 3,3',3''-[2,4,6-pyridinetriyltris(2,3,5,6-tetramethyl-4,1-phenylene)]tris[6-methyl-9-phenyl- (9CI) (CA INDEX NAME)

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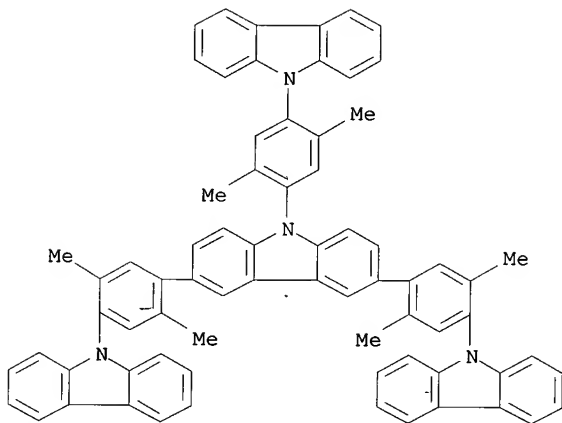
USHA SHRESTHA REM 4B28



RN 699119-73-8 HCAPLUS
CN 9H-Carbazole, 9,9',9'',9'''-(2,3,5,6-pyrazinetetrayltetra-4,1-phenylene)tetrakis- (9CI) (CA INDEX NAME)

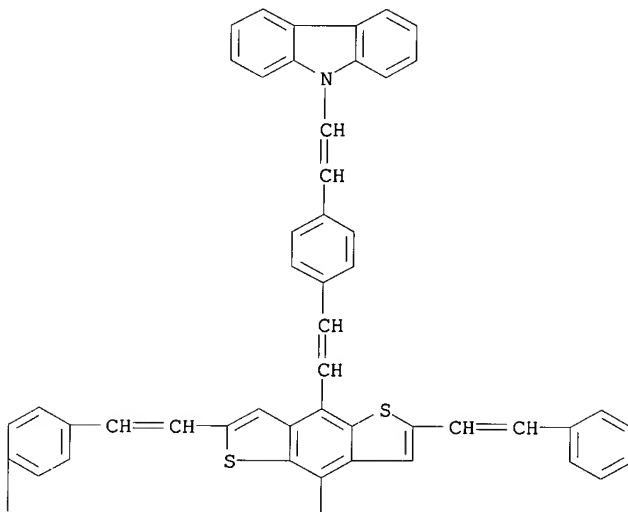


RN 699119-77-2 HCAPLUS
CN 9H-Carbazole, 3,6,9-tris[4-(9H-carbazol-9-yl)-2,5-dimethylphenyl]-
(9CI) (CA INDEX NAME)

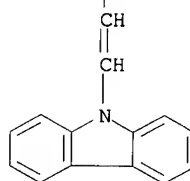
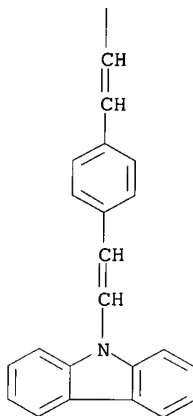
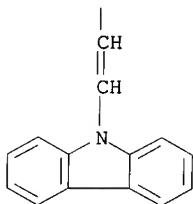


RN 699119-81-8 HCAPLUS
 CN 9H-Carbazole, 9,9',9'',9'''-[benzo[1,2-b:4,5-b']dithiophene-2,4,6,8-tetrayltetrakis(2,1-ethenediyl-4,1-phenylene-2,1-ethenediyl)]tetrakis- (9CI) (CA INDEX NAME)

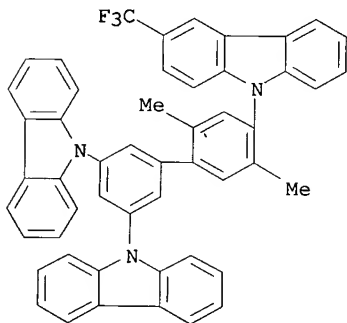
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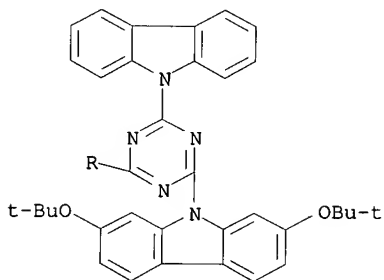
RN 699119-86-3 HCAPLUS
 CN 9H-Carbazole, 9-[3',5'-bis(9H-carbazol-9-yl)-2,5-dimethyl[1,1'-biphenyl]-4-yl]-3-(trifluoromethyl)- (9CI) (CA INDEX NAME)



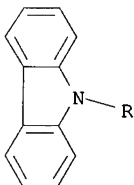
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 CN 9H-Carbazole, 9-[4,6-bis(9H-carbazol-9-yl)-1,3,5-triazin-2-yl]-2,7-

bis(1,1-dimethylethoxy)- (9CI) (CA INDEX NAME)

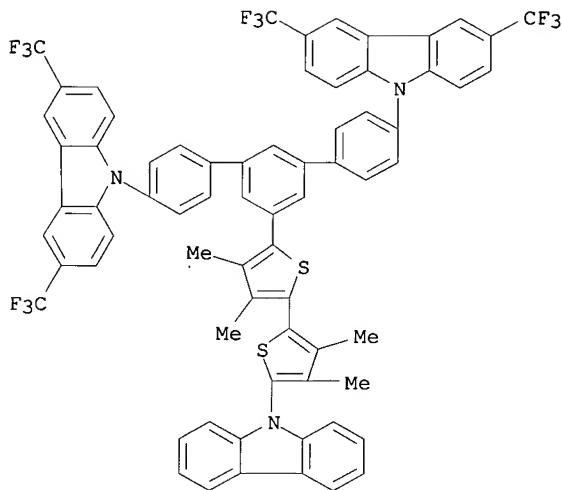
PAGE 1-A



PAGE 2-A



RN 699120-00-8 HCAPLUS
 CN 9H-Carbazole, 9,9'-[5'-[5'-(9H-carbazol-9-yl)-3,3',4,4'-
 tetramethyl[2,2'-bithiophen]-5-yl][1,1':3',1''-terphenyl]-4,4''-
 diyl]bis[3,6-bis(trifluoromethyl)- (9CI) (CA INDEX NAME)



IC ICM H05B033-14
 NCL 428690000; 428917000; 313504000; 313506000; 257102000; 257103000
 CC 73-11 (**Optical**, Electron, and Mass Spectroscopy and
 Other Related Properties)
 Section cross-reference(s): 74

IT **699119-91-0P**
 (org. electroluminescent device and display having light
 emitting layer containing phosphorescent substance)

IT **699119-36-3P 699119-40-9P 699119-44-3P**
699119-49-8P 699119-54-5P 699119-58-9P
699119-61-4P 699119-65-8P 699119-69-2P
699119-73-8P 699119-77-2P 699119-81-8P
699119-86-3P 699119-96-5P 699120-00-8P
 (organic electroluminescent device and display having light
 emitting layer containing phosphorescent substance)

L14 ANSWER 17 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2004:400207 HCAPLUS

DOCUMENT NUMBER: 141:147752

TITLE: Dendron-Functionalized Macromolecules:

USHA SHRESTHA REM 4B28

Enhancing Core Luminescence and Tuning Carrier Injection

AUTHOR(S):

Du, Pa; Zhu, Wei-Hong; Xie, Yu-Qing; Zhao, Fei; Ku, Chien-Fong; Cao, Yong; Chang, Chen-Pin; Tian, He

CORPORATE SOURCE:

Lab for Advanced Materials and Institute of Fine Chemicals, East China University of Science Technology, Shanghai, 200237, Peop. Rep. China

SOURCE:

Macromolecules (2004), 37(12), 4387-4398
CODEN: MAMOBX; ISSN: 0024-9297

PUBLISHER:

American Chemical Society

DOCUMENT TYPE:

Journal

LANGUAGE:

English

AB A novel series of naphthalimide dendrimers has been synthesized based on a convergent and divergent combined approach. The dendrimers consist of naphthalimide-based cores, Frechet-type poly(aryl ether) dendrons, and carbazole (CZ) or oxadiazole (OXZ) peripheral groups. The higher generation dendrimer has site-isolation effect, or the dilution effect of the dendrons. This configuration would reduce the aggregating extent or possibility of the core unit, thus resulting in a relatively small red-shift of absorption and fluorescent spectra when they form a solid film for the applications. Studies of steady-state fluorescence properties of the dendrimers show that excitation of the terminal chromophores results mainly in the core emission alone, as the donor emission is seriously quenched due to its effective Foerster intramol. energy transfer to the core. The dendrimers show enhanced luminescence properties of the core, and the enhanced luminescent efficiency is dependent on the generation number of the dendrimers. Time-resolved luminescent measurements further supported the conclusion that the contribution tendency for each peripheral donor is decreased with the increasing of the generation number, especially for the third generation. The dendron-incorporated carbazole unit can decrease the HOMO orbital energy by 0.4 eV, thus facilitating the hole-injection in **electroluminescent (EL)** devices. The preliminary **EL** results with a single-layer architecture made with the dendrimers by means of the spin-coating technique demonstrate that these dendrimers could be utilized as promising active nondoping emitters.

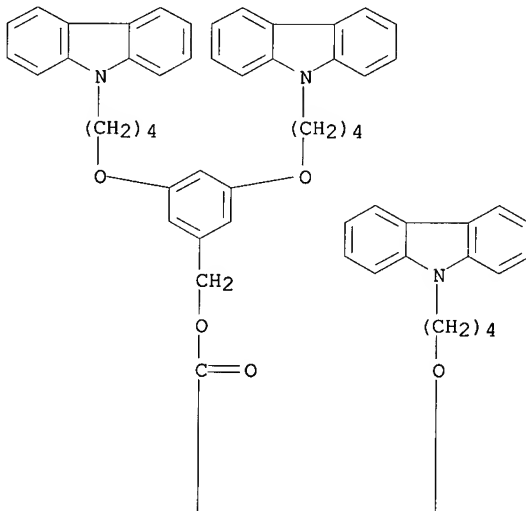
IT 724422-28-0P 724422-29-1P 727709-53-7P

727709-55-9P 727709-57-1P 727709-59-3P

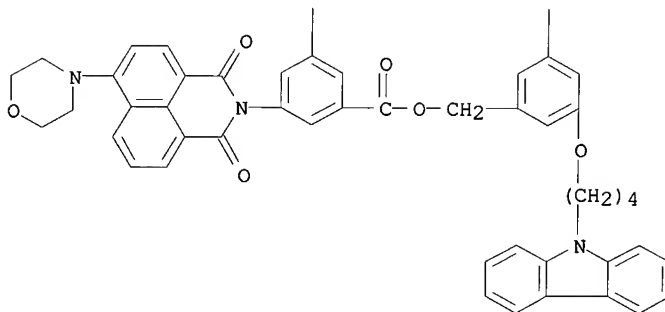
(dendron-functionalized macromols. for enhancing core luminescence and tuning carrier injection)

RN 724422-28-0 HCAPLUS
CN 1,3-Benzenedicarboxylic acid, 5-[6-(4-morpholinyl)-1,3-dioxo-1H-benz[de]isoquinolin-2(3H)-yl]-, bis[[3,5-bis[4-(9H-carbazol-9-yl)butoxy]phenyl)methyl] ester (9CI) (CA INDEX NAME)

PAGE 1-A

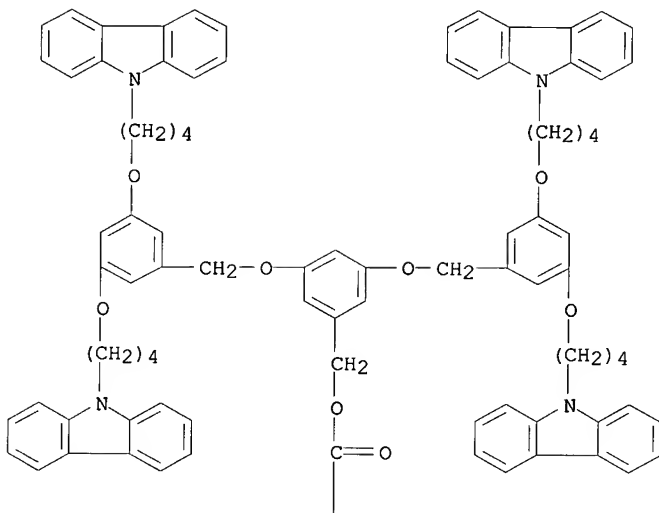


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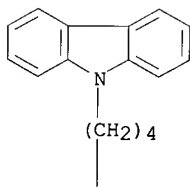


RN 724422-29-1 HCAPLUS
 CN 1,3-Benzenedicarboxylic acid, 5-[6-(4-morpholinyl)-1,3-dioxo-1H-benz[de]isoquinolin-2(3H)-yl]-, bis[[3,5-bis[[3,5-bis[4-(9H-carbazol-9-yl)butoxy]phenyl]methoxy]phenyl]methyl] ester (9CI)
 (CA INDEX NAME)

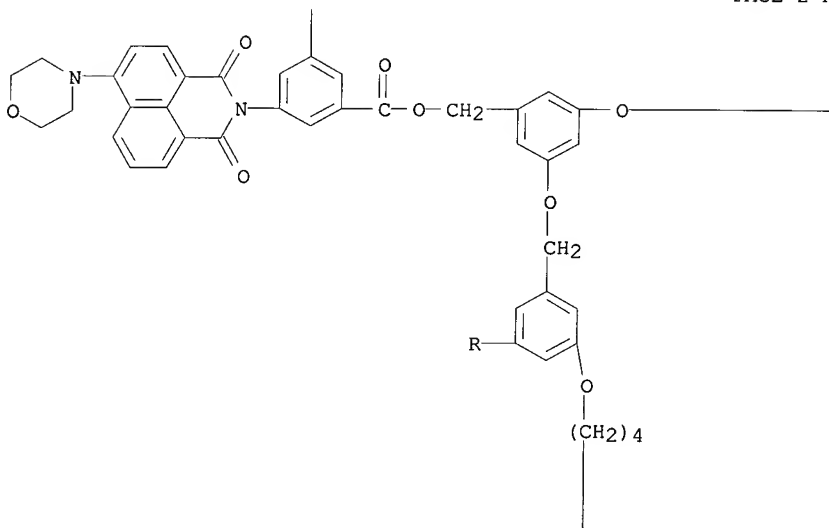
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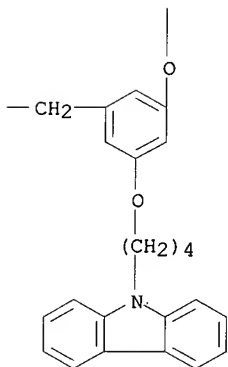
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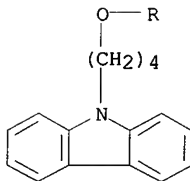
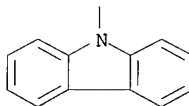
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PAGE 2-B



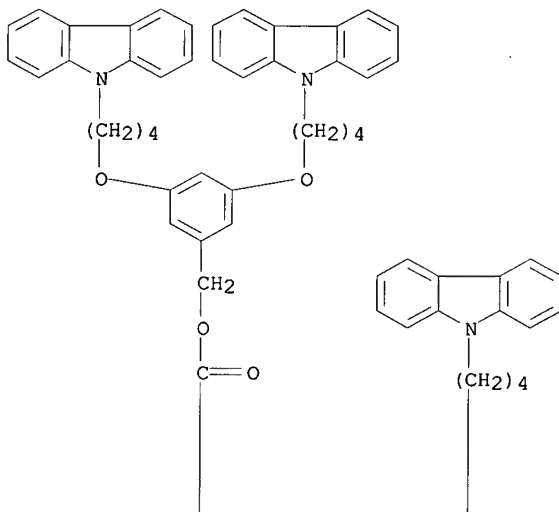
PAGE 3-A



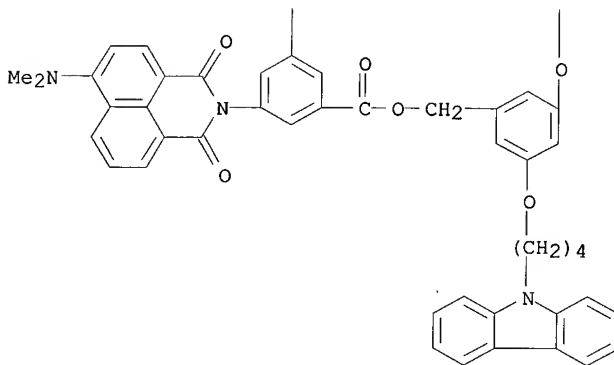
RN 727709-53-7 HCAPLUS
 CN 1,3-Benzenedicarboxylic acid, 5-[6-(dimethylamino)-1,3-dioxo-1H-benz[de]isoquinolin-2(3H)-yl]-, bis[[3,5-bis[4-(9H-carbazol-9-yl)butoxy]phenyl]methyl] ester (9CI) (CA INDEX NAME)

USHA SHRESTHA REM 4B28

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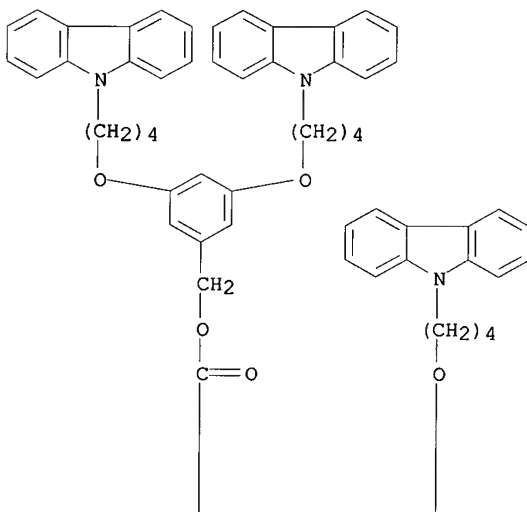


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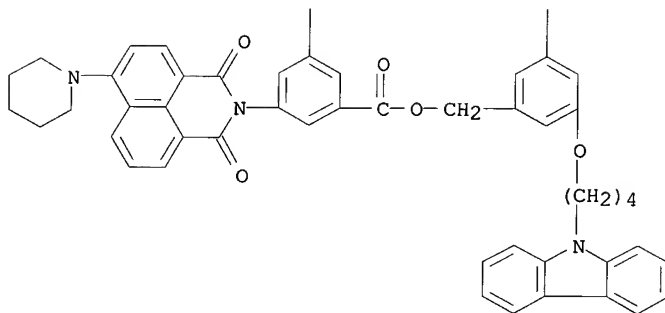


RN 727709-55-9 HCAPLUS
 CN 1,3-Benzenedicarboxylic acid, 5-[1,3-dioxo-6-(1-piperidinyl)-1H-benz[de]isoquinolin-2(3H)-yl]-, bis[[3,5-bis[4-(9H-carbazol-9-yl)butoxy]phenylmethyl] ester (9CI) (CA INDEX NAME)

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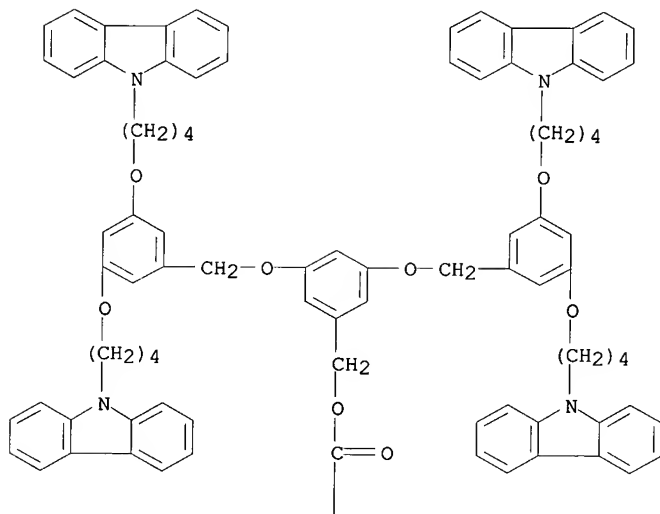


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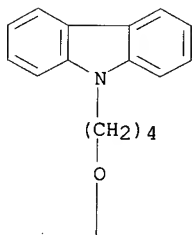


RN 727709-57-1 HCAPLUS
 CN 1,3-Benzenedicarboxylic acid, 5-[6-(dimethylamino)-1,3-dioxo-1H-benz[de]isoquinolin-2(3H)-yl]-, bis[[3,5-bis[[3,5-bis[4-(9H-carbazol-9-yl)butoxy]phenyl]methoxy]phenyl]methyl] ester (9CI)
 (CA INDEX NAME)

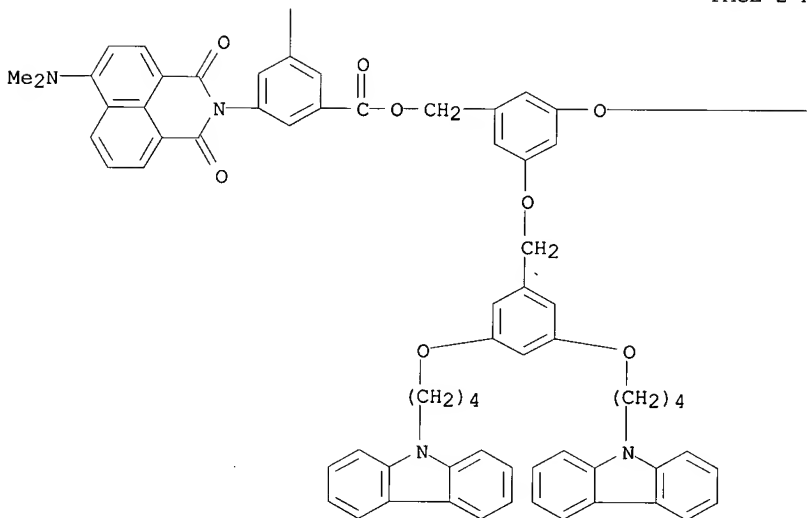
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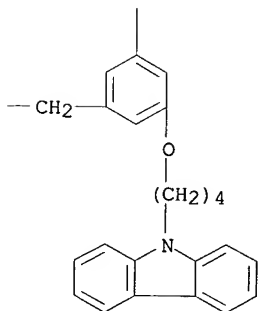
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PAGE 2-A

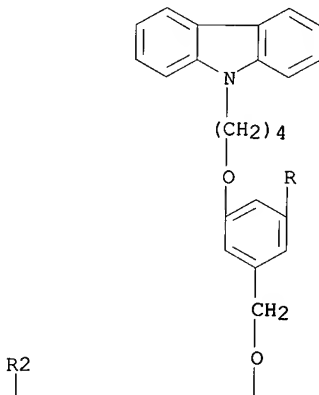


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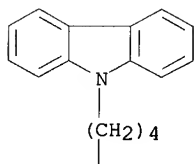


RN 727709-59-3 HCAPLUS
CN 1,3-Benzenedicarboxylic acid, 5-[1,3-dioxo-6-(1-piperidiny1)-1H-benz[de]isoquinolin-2(3H)-yl]-, bis[[3,5-bis[[3,5-bis[4-(9H-carbazol-9-yl)butoxy]phenyl]methoxy]phenyl]methyl] ester (9CI)
(CA INDEX NAME)

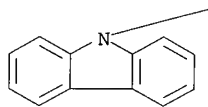
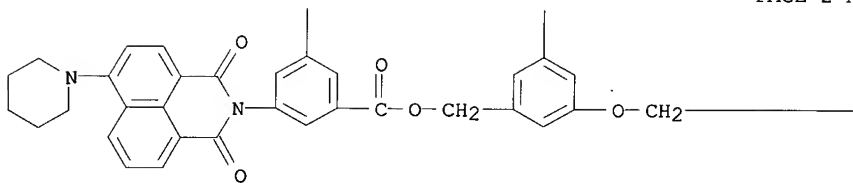
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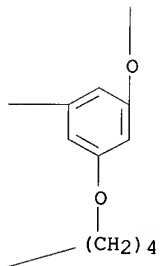
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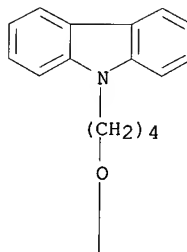
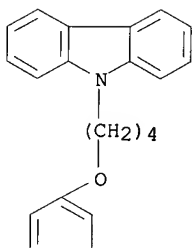
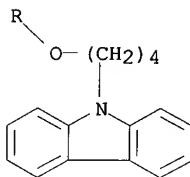
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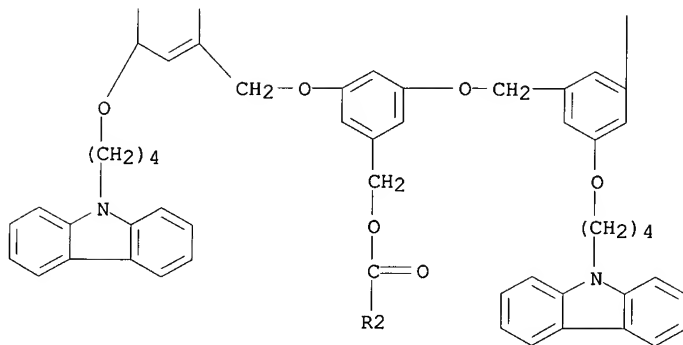


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Section cross-reference(s): 22, 38

727709-43-5P 727709-45-7P 727709-4

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727709-49-1P 727709-50-4P 727709-51-5P 727709-52-6P

727709-53-7P 727709-55-9P 727709-57-1P

727709-59-3P

(dendron-functionalized macromols. for enhancing core luminescence and tuning carrier injection)

REFERENCE COUNT: 43 THERE ARE 43 CITED REFERENCES AVAILABLE
FOR THIS RECORD. ALL CITATIONS AVAILABLE
IN THE RE FORMAT

L14 ANSWER 18 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2004:380872 HCAPLUS

DOCUMENT NUMBER: 141:113740

TITLE: Very high-efficiency and low voltage
phosphorescent organic light-emitting diodes
based on a p-i-n junction

AUTHOR(S): He, Gufeng; Schneider, Oliver; Qin, Dashan;

CORPORATE SOURCE: Institut fuer Angewandte Photophysik,
Technische Universitaet Dresden, Dresden,
D-01062, Germany

SOURCE: Journal of Applied Physics (2004), 95(10), 5773-5777

USHA SHRESTHA REM 4B28

CODEN: JAPIAU; ISSN: 0021-8979

American Institute of Physics

Journal

English

PUBLISHER:

DOCUMENT TYPE:

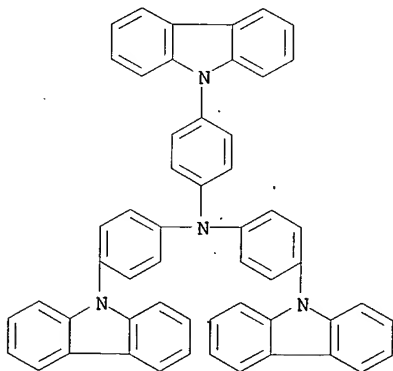
LANGUAGE:

AB Green phosphorescent organic light-emitting devices (OLEDs) employing tris(2-phenylpyridine) Ir doped into a wide energy gap hole transport host were studied. N,N,N',N'-tetrakis(4-methoxyphenyl)-benzidine doped with 2,3,5,6-tetrafluoro-7,7,8,8-tetracyanoquinodimethane is used as a hole injection and transport layer, 4,7-diphenyl-1,10-phenanthroline and Cs are coevaporated as a n-doped electron transport layer, and an intrinsic emission layer is sandwiched between these 2 doped layer. Such a p-i-n device features efficient carrier injection from both contacts into the doped transport layers and low ohmic losses in these highly conductive layers. Thus, low operating voltages are obtained compared to conventional undoped OLEDs. By modifying the device structure, the authors optimized the carrier balance in the emission layer and at its interfaces. For the optimized device, the maximum power efficiency is 53 lm/W, and a luminance of 1000 cd/m² is reached at 3.1 V with a power efficiency of 45 lm/W.

IT **139092-78-7**, 4,4',4''-Tris(N-carbazolyl)triphenylamine
(very high-efficiency and low voltage phosphorescent organic LEDs based on p-i-n junction containing)

RN 139092-78-7 HCAPLUS

CN Benzenamine, 4-(9H-carbazol-9-yl)-N,N-bis[4-(9H-carbazol-9-yl)phenyl]- (9CI) (CA INDEX NAME)



CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 76
IT 7789-24-4, Lithium fluoride, uses 94928-86-6,
Tris(2-phenylpyridine) Iridium **139092-78-7**,
4,4',4''-Tris(N-carbazolyl)triphenylamine 189363-47-1,
2,2',7,7'-Tetrakis(diphenylamino)-9,9'-spirobifluorene
(very high-efficiency and low voltage phosphorescent organic
LEDs based on p-i-n junction containing)
REFERENCE COUNT: 22 THERE ARE 22 CITED REFERENCES AVAILABLE
FOR THIS RECORD. ALL CITATIONS AVAILABLE
IN THE RE FORMAT

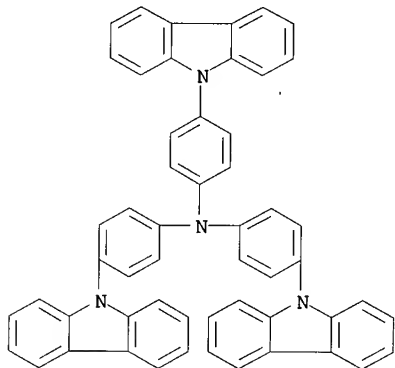
L14 ANSWER 19 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN
ACCESSION NUMBER: 2004:371815 HCAPLUS
DOCUMENT NUMBER: 141:147748
TITLE: Efficient organic electrophosphorescent
white-light-emitting device with a triple
doped emissive layer
AUTHOR(S): D'Andrade, Brian W.; Holmes, Russell J.;
Forrest, Stephen R.
CORPORATE SOURCE: Department of Electrical Engineering,
Princeton University, Princeton, NJ, 08544,
USA
SOURCE: Advanced Materials (Weinheim, Germany) (2004),
16(7), 624-628
CODEN: ADVMEW; ISSN: 0935-9648
PUBLISHER: Wiley-VCH Verlag GmbH & Co. KGaA
DOCUMENT TYPE: Journal
LANGUAGE: English

AB A high efficiency white organic LED with a thin electrophosphorescent
triple doped host and efficient exciton and charge confinement is
demonstrated. Devices have $\eta_p = 14 \pm 1$ lm W⁻¹ at 10 mA
cm⁻², a maximum $\eta_l = 42 \pm 4$ lm W⁻¹ and CIE coordinates that
vary from [0.43,45] at 0.1 mA cm⁻² to [0.38,0.45] at 10 mA cm⁻²,
with CRI = 80. The device emission color is effectively
controlled by varying dopant concns. As in the case of recently
reported deep-blue-emitting electrophosphorescent OLEDs, high
efficiency is obtained by direct triplet formation on the blue
dopant by near-resonant charge transfer from nearby charge
injection layers, avoiding exchange energy losses incurred by
energy transfer from a singlet exciton state in the host to a
triplet state in the phosphor.
IT **139092-78-7**

(efficient organic electrophosphorescent white **LED** with triple doped emissive layer containing)

RN 139092-78-7 HCAPLUS

CN Benzenamine, 4-(9H-carbazol-9-yl)-N,N-bis[4-(9H-carbazol-9-yl)phenyl]- (9CI) (CA INDEX NAME)



CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 76

IT 18856-08-1 **139092-78-7** 192198-85-9,
1,3,5-Tris(N-phenylbenzimidazol-2-yl)benzene

(efficient organic electrophosphorescent white **LED** with triple doped emissive layer containing)

REFERENCE COUNT: 23 THERE ARE 23 CITED REFERENCES AVAILABLE
FOR THIS RECORD. ALL CITATIONS AVAILABLE
IN THE RE FORMAT

L14 ANSWER 20 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2004:319845 HCAPLUS

DOCUMENT NUMBER: 141:130934

TITLE: Electroluminescence of LEDs consisting two
layers of Alq3 and high Tg, blue-light
emitting branched compounds

AUTHOR(S): Cha, Soon Wook; Jin, Jung-Il

CORPORATE SOURCE: Center for Electro- and Photo-Responsive
Molecules, Department of Chemistry, Korea

SOURCE: University, Seoul, 136-701, S. Korea
Synthetic Metals (2004), 143(1), 97-101
CODEN: SYMEDZ; ISSN: 0379-6779
PUBLISHER: Elsevier Science B.V.
DOCUMENT TYPE: Journal
LANGUAGE: English

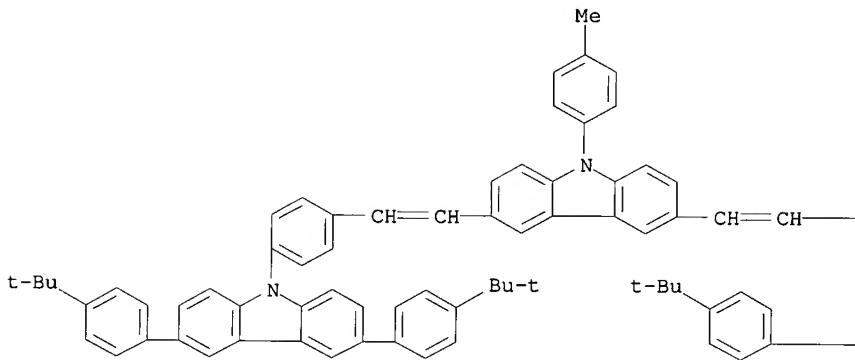
AB Two high glass transition (Tg) (>250°) organic compds., Cz3d and tris-[4-(2-[4-[3,6-bis(4-t-butylphenyl)carbazole-9-yl]phenyl]vinyl)phenyl]amine (TPA-Cz3d), containing three carbazole moieties were used in the construction of bilayer devices consisting of the compds. and tris(8-hydroquinolinato)aluminum (Alq3) layers. TAP-Cz3d has the tri-Ph amine moiety as a core. They themselves performed poorly as blue-light emitters in single layer LEDs. The bilayer devices revealed much improved electroluminescence (EL) properties emitting light of maximum brightness of 7400-13,000 Cd/m2 with an external quantum efficiency approaching 0.6%. But emitted light of the bilayer devices was not from the organic layer but was from Alq3 layer indicating that the two compds. was efficient hole transporters. In all the devices, In Sn oxide (ITO)-coated glass and a Li/Al alloy were used as anode and cathode, resp.

IT 535995-35-8 723343-48-4
(electroluminescence of LEDs consisting two layers of Alq3 and high Tg, blue-light emitting branched compds. and optical properties of emitters)

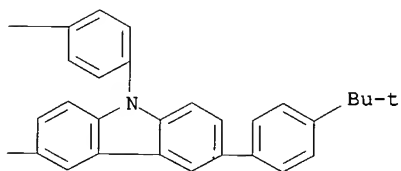
RN 535995-35-8 HCAPLUS

CN 9H-Carbazole, 3,6-bis[2-[4-[3,6-bis[4-(1,1-dimethylethyl)phenyl]-9H-carbazol-9-yl]phenyl]ethenyl]-9-(4-methylphenyl)- (9CI) (CA INDEX NAME)

PAGE 1-A



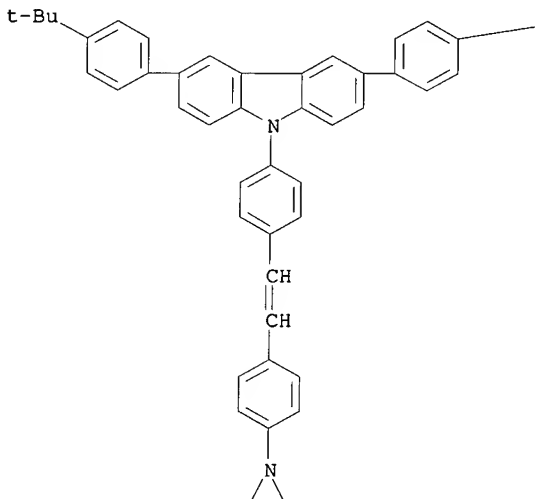
PAGE 1-B



RN 723343-48-4 HCAPLUS
 CN Benzenamine, 4-[2-[4-[3,6-bis[4-(1,1-dimethylethyl)phenyl]-9H-carbazol-9-yl]phenyl]ethenyl]-N,N-bis[4-[2-[4-[3,6-bis[4-(1,1-

dimethylethyl)phenyl]-9H-carbazol-9-yl]phenyl]ethenyl]phenyl]-
(9CI) (CA INDEX NAME)

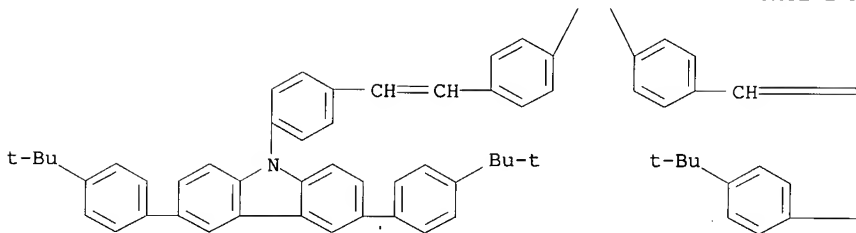
PAGE 1-A



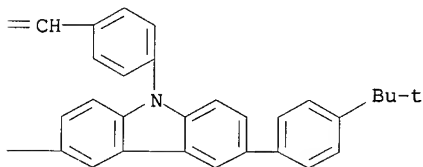
PAGE 1-B

Bu-t

PAGE 2-A



PAGE 2-B



CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 22

IT 2085-33-8, Aluminum tris(8-hydroxyquinolinato) **535995-35-8**

723343-48-4

(electroluminescence of **LEDs** consisting two layers of Alq3 and high Tg, blue-light emitting branched compds. and optical properties of emitters)

REFERENCE COUNT: 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L14 ANSWER 21 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2004:174889 HCAPLUS

DOCUMENT NUMBER: 142:29538

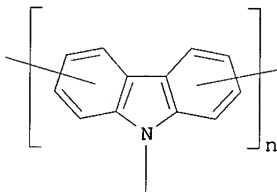
TITLE: Host materials for triplet emitters

USHA SHRESTHA REM 4B28

AUTHOR(S): Anon.
 CORPORATE SOURCE: Neth.
 SOURCE: IP.com Journal (2003), 4(1), 26 (No. IPCOM000021063D), 19 Dec 2003
 CODEN: IJPOBX; ISSN: 1533-0001
 PUBLISHER: IP.com, Inc.
 DOCUMENT TYPE: Journal; Patent
 LANGUAGE: English
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
----- ----- IP 21063D		20031219		
PRIORITY APPLN. INFO.: 20031219			IP 2003-21063D	

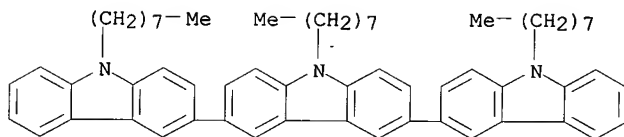
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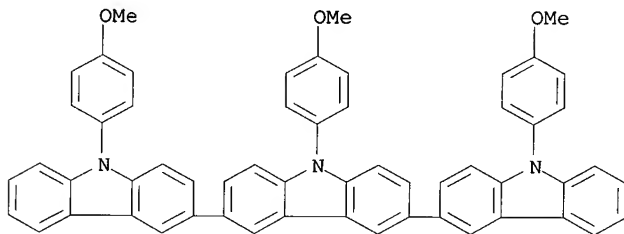
I

- AB Carbazole compds. are described by the general formula I ($n \geq 2$) in which each carbazole unit may be (un)substituted with ≥ 1 substituents. The carbazole compds. may be combined with **light-emitting** compds. (e.g., triplet emitter compds.) capable of accepting energy from the carbazole compds. **Electroluminescent** devices employing the compds. or the **light-emitting** compound-carbazole compound combinations are also described.
- IT **628336-90-3P 714972-57-3P**
 (oligomeric or polymeric carbazole compds. and luminescent compds. containing them and electroluminescent devices using them)
- RN 628336-90-3 HCAPLUS
- CN 3,3':6',3''-Ter-9H-carbazole, 9,9',9''-trioctyl- (9CI) (CA INDEX

NAME)



RN 714972-57-3 HCAPLUS
 CN 3,3':6',3''-Ter-9H-carbazole, 9,9',9''-tris(4-methoxyphenyl)-
 (9CI) (CA INDEX NAME)



CC 73-11 (Optical, Electron, and Mass Spectroscopy and
 Other Related Properties)
 Section cross-reference(s): 27, 76
 IT 57102-48-4P 193017-42-4P **628336-90-3P**
714972-57-3P
 (oligomeric or polymeric carbazole compds. and luminescent
 compns. containing them and electroluminescent devices using them)

L14 ANSWER 22 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2004:159347 HCAPLUS

DOCUMENT NUMBER: 140:189778

TITLE: Tetra(aminoaryl)methanes as electroluminescent
 substances for organic electroluminescent
 devices, and their manufacture

INVENTOR(S): Hashimoto, Mitsuru

PATENT ASSIGNEE(S): Matsushita Electric Industrial Co., Ltd.,
 Japan

USHA SHRESTHA REM 4B28

SOURCE: Jpn. Kokai Tokkyo Koho, 12 pp.
 CODEN: JKXXAF
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

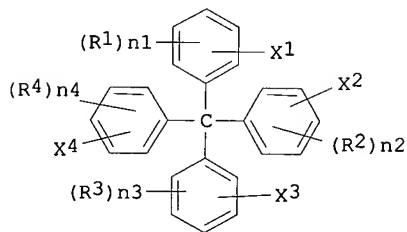
PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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JP 2004059556	A2	20040226	JP 2002-224049	

2002
0731

PRIORITY APPLN. INFO.: JP 2002-224049

2002
0731

OTHER SOURCE(S): MARPAT 140:189778
 GI



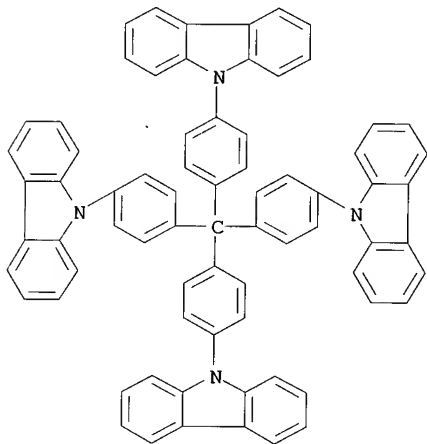
AB The tetra(aminoaryl)methanes I ($X_1 = \text{NR}_{11}\text{R}_{111}$; $X_2 = \text{NR}_{12}\text{R}_{112}$; $X_3 = \text{NR}_{13}\text{R}_{113}$; $X_4 = \text{NR}_{14}\text{R}_{114}$; $\text{R}_{11}-\text{R}_{14}$, $\text{R}_{111}-\text{R}_{114}$ = aromatic hydrocarbyl, heterocyclic group; R_1-R_4 = alkyl, alkoxy, halo, cyano, NO_2 ; $n_1-n_4 = 0-4$) are manufactured by treatment of $\text{R}_{10}\text{R}_{100}\text{NM}$ (R_{10} , R_{100} = aromatic hydrocarbyl, heterocyclic group; $\text{M} = \text{H}, \text{Na}, \text{K}$) with I [$\text{X} = \text{Cl}, \text{Br}, \text{iodide}$; R_1-R_4 , n_1-n_4 = same as above]. The organic **electroluminescent** devices show high luminescent intensity at low voltage and long service life.

IT 255721-13-2P

(manufacture of tetra(aminoaryl)methanes as electroluminescent substances for organic electroluminescent devices)

RN 255721-13-2 HCAPLUS

CN 9H-Carbazole, 9,9',9'',9'''-(methanetetrayltetra-4,1-phenylene)tetrakis- (9CI) (CA INDEX NAME)



IC ICM C07C211-54

ICS C07C209-10; C07D209-88; G03G005-06; H05B033-14; H05B033-22; C09K011-06

CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 25

IT 255721-13-2P 255824-08-9P

(manufacture of tetra(aminoaryl)methanes as electroluminescent substances for organic electroluminescent devices)

L14 ANSWER 23 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2004:102181 HCAPLUS

DOCUMENT NUMBER: 140:294453

TITLE: Efficient organic blue-light-emitting devices with double confinement on terfluorenes with

AUTHOR(S): ambipolar carrier transport properties
Wu, Chung-Chih; Lin, Yu-Ting; Wong, Ken-Tsung;
Chen, Ruei-Tang; Chien, Yuh-Yih

CORPORATE SOURCE: Department of Electrical Engineering, Graduate
Institute of Electro-optical Engineering and
Graduate Institute of Electronics Engineering,
National Taiwan University, Taipei, 106,
Taiwan

SOURCE: Advanced Materials (Weinheim, Germany) (2004),
16(1), 61-65
CODEN: ADVMEW; ISSN: 0935-9648

PUBLISHER: Wiley-VCH Verlag GmbH & Co. KGaA

DOCUMENT TYPE: Journal

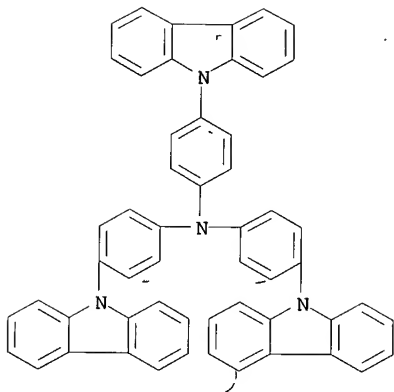
LANGUAGE: English

AB Ter(9,9-diarylf luorene)s (TDAFs) exhibit many intriguing
properties promising for blue light-emitting devices, such as high
thin-film luminescence quantum yields (.apprx.90%), high
glass-transition temps. (>200°), and an unusual ambipolar
carrier-transport capability. Successful implementation of a
double-heterostructure device configuration that provides
effective confinement of both carriers and excitons in TDAFs
results in an electroluminescence performance (5.3% external
quantum efficiency) promising for application in blue-emitting
devices.

IT 139092-78-7, 4,4',4''-Tris(N-carbazolyl)triphenylamine
(in efficient organic blue **LEDs** with double confinement
on terfluorenes with ambipolar carrier transport properties)

RN 139092-78-7 HCAPLUS

CN Benzenamine, 4-(9H-carbazol-9-yl)-N,N-bis[4-(9H-carbazol-9-
yl)phenyl]- (9CI) (CA INDEX NAME)



CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 22, 76

IT 4733-39-5, 2,9-Dimethyl-4,7-diphenyl-1,10-phenanthroline
139092-78-7, 4,4',4''-Tris(N-carbazolyl)triphenylamine
 192198-85-9, 2,2',2''-(1,3,5-Benzenetriyl)tris[1-phenyl-1H-benzimidazole]

(in efficient organic blue **LEDs** with double confinement on terfluorenes with ambipolar carrier transport properties)

REFERENCE COUNT: 34 THERE ARE 34 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L14 ANSWER 24 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2003:874704 HCAPLUS

DOCUMENT NUMBER: 139:371586

TITLE: Carbazole-based materials for guest-host electroluminescent systems

INVENTOR(S): Thoms, Travis P. S.; Chen, Jian-Ping

PATENT ASSIGNEE(S): Canon Kabushiki Kaisha, Japan

SOURCE: U.S. Pat. Appl. Publ., 10,pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

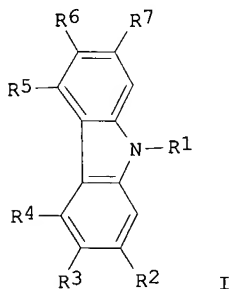
LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO. ----- -----	KIND ---	DATE -----	APPLICATION NO. ----- -----	DATE
US 2003205696	A1	20031106	US 2002-131382	2002 0425
JP 2003317966	A2	20031107	JP 2003-114193	2003 0418
PRIORITY APPLN. INFO.:			US 2002-131382	A 2002 0425

OTHER SOURCE(S): MARPAT 139:371586
GI



AB Guest-host emissive systems for use in an organic **light-emitting** device are described which comprise a guest and a host, where the host comprises a carbazole-based compound with formula (I), where R1 is an electron-donating group, and at least one of R2-7 is an aromatic amine or carbazole moiety having hole transport capability, and where the guest is a **light-emitting** compound having smaller band gap than the host. Guest-host emissive systems for use in an organic **light-emitting** device are described which comprise a host and a guest, where the host comprises a core selected from the group consisting of C, benzene, furan, thiophene, pyrrole and

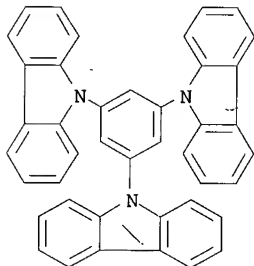
tetraphenylmethane, and ≥ 2 carbazole groups or carbazole groups substituted with electron-donating groups bonded to the core, and where the guest is a **light-emitting** material having a smaller band gap potential than the host. The disclosed host materials have a large band gap potential and high-energy triplet excited states to permit short-wavelength phosphorescent emission by the associated guest material.

IT **148044-07-9P**

(host; carbazole-based materials for guest-host electroluminescent systems)

RN 148044-07-9 HCAPLUS

CN 9H-Carbazole, 9,9',9''-(1,3,5-benzenetriyl)tris- (9CI) (CA INDEX NAME)



IC ICM C09K011-06

ICS H05B033-14

NCL 252301160; 428690000; 428917000; 313504000

CC 73-5 (**Optical**, Electron, and Mass Spectroscopy and Other Related Properties)

IT **148044-07-9P**

(host; carbazole-based materials for guest-host electroluminescent systems)

L14 ANSWER 25 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2003:758033 HCAPLUS

DOCUMENT NUMBER: 139:283130

TITLE: Phosphorescent dendrimers for use in light-emitting devices

INVENTOR(S): Lo, Shih-chun; Burn, Paul Leslie; Samuel, Ifor David William; Anthopoulos, Thomas Dimitrios

USHA SHRESTHA REM 4B28

PATENT ASSIGNEE(S): Isis Innovation Limited, UK; The University
 Court of the University of St. Andrews
 SOURCE: PCT Int. Appl., 60 pp.
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 2
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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WO 2003079736	A1	20030925	WO 2003-GB1132	2003 0318
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
EP 1491074	A1	20041229	EP 2003-709993	2003 0318
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK				
PRIORITY APPLN. INFO.:			GB 2002-6356	A 2002 0318
			GB 2002-20091	A 2002 0829
			GB 2002-20092	A 2002 0829

WO 2003-GB1132

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0318

AB A **light emitting** device which comprises at least one layer that contains a phosphorescent organometallic dendrimer with a metal cation and ≥ 2 coordinating groups as part of its core and wherein at least 2 of said coordinating groups each have a dendron attached, at least one of which dendrons comprises at least one N atom which forms part of an aromatic ring system or is directly bonded to at least 2 aromatic groups.

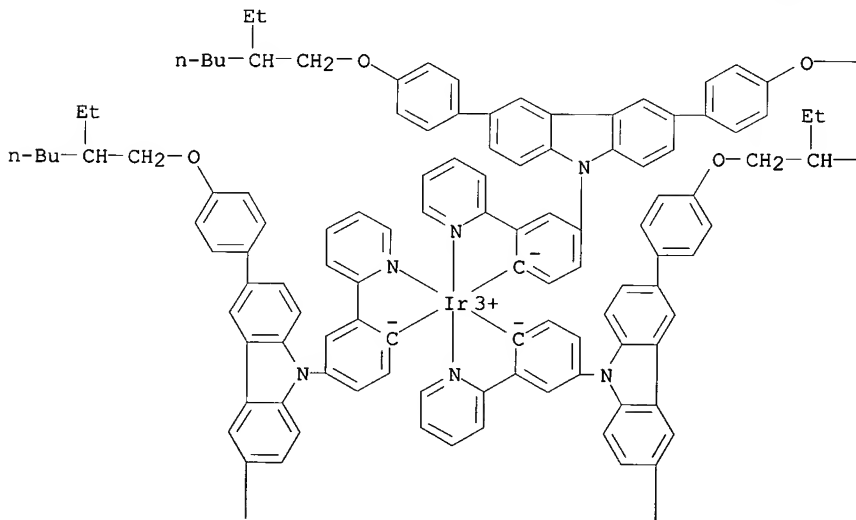
IT **606932-48-3P**

(phosphorescent dendrimers for use in light-emitting devices)

RN 606932-48-3 HCAPLUS

CN Iridium, tris[4-[3,6-bis[4-[(2-ethylhexyl)oxy]phenyl]-9H-carbazol-9-yl]-2-(2-pyridinyl-κN)phenyl-κC]-, (OC-6-22)- (9CI)
(CA INDEX NAME)

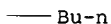
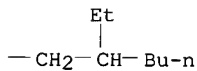
PAGE 1-A



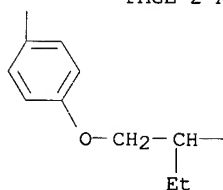
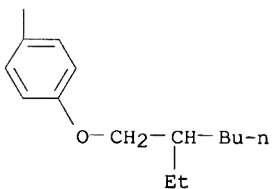
USHA SHRESTHA

REM 4B28

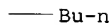
PAGE 1-B



PAGE 2-A



PAGE 2-B



IC ICM H05B033-14
 ICS C09K011-06; H01L051-20; C07F015-00; H01L051-30
 CC 73-11 (**Optical**, Electron, and Mass Spectroscopy and
 Other Related Properties)
 Section cross-reference(s): 29
 IT **606932-48-3P** 606932-53-0P 606976-70-9P
 (phosphorescent dendrimers for use in light-emitting devices)

REFERENCE COUNT: 4 THERE ARE 4 CITED REFERENCES AVAILABLE
FOR THIS RECORD. ALL CITATIONS AVAILABLE
IN THE RE FORMAT

L14 ANSWER 26 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2003:737845 HCAPLUS

DOCUMENT NUMBER: 139:267723

TITLE: Polymerizable compositions and organic
light-emitting devices containing them

INVENTOR(S): Andrews, Mark David; Look, Kai; Mosley, Alan;
Steudel, Annette Regine

PATENT ASSIGNEE(S): CDT Oxford Limited, UK

SOURCE: PCT Int. Appl., 42 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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WO 2003076548	A1	20030918	WO 2003-GB899	
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2003
0303

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA,
CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG,
KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK,
MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD,
SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,
VC, VN, YU, ZA, ZM, ZW

RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM,
AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ,
DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL,
PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN,
GQ, GW, ML, MR, NE, SN, TD, TG

EP 1483354	A1	20041208	EP 2003-743927	
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2003
0303

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE,
MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ,
EE, HU, SK

PRIORITY APPLN. INFO.: GB 2002-5592 A

2002

USHA SHRESTHA REM 4B28

0309

GB 2002-13902

A

2002
0618

WO 2003-GB899

W

2003
0303

AB Compns. of a mixture of a thiol material and a material that contains a reactive unsatd. C-C bond that can be polymerized to form a charge-transporting or luminescent film are described, as is an organic **light-emitting diode (OLED)** device comprising at least one such charge-transporting or emissive layer that was formed by polymerizing a thiol material and an ene material. The process for forming such an **OLED**, including the deposition of a layer of material comprising the polymerizable composition, from solution, exposing said layer to actinic radiation through a mask, and then optionally developing said film to form a photopatterned film, is also disclosed.

IT **602299-91-2P 602299-93-4P**
(polymerizable compns. for organic light-emitting devices)

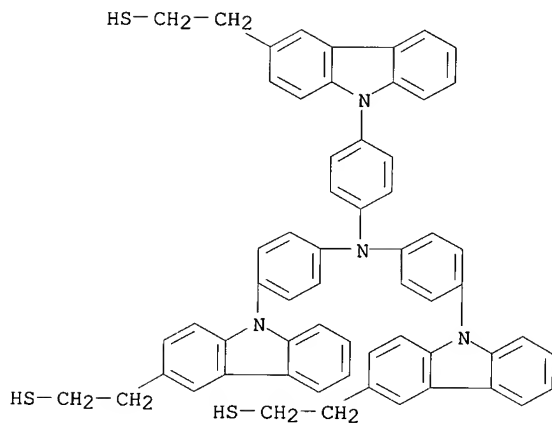
RN 602299-91-2 HCAPLUS

CN 9H-Carbazole-3-ethanethiol, 9,9',9''-(nitrilotri-4,1-phenylene)tris-, polymer with 4-(3-ethenyl-9H-carbazol-9-yl)-N,N-bis[4-(3-ethenyl-9H-carbazol-9-yl)phenyl]benzenamine (9CI) (CA INDEX NAME)

CM 1

CRN 602299-90-1

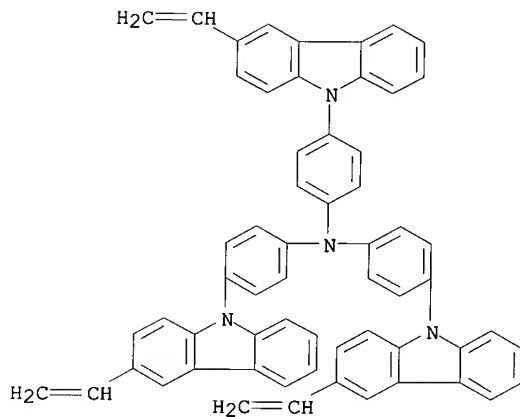
CMF C60 H48 N4 S3



CM 2

CRN 602299-88-7

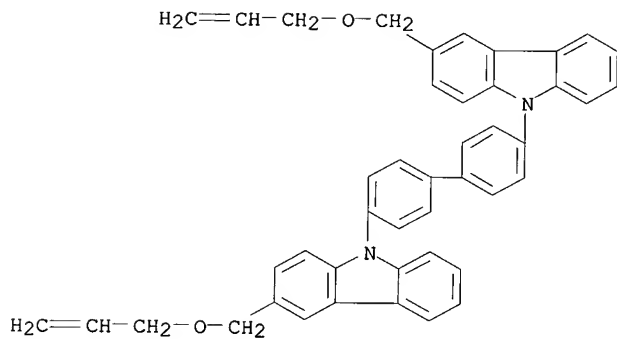
CMF C60 H42 N4



RN 602299-93-4 HCAPLUS
 CN 9H-Carbazole-3-ethanethiol, 9,9',9''-(nitritotri-4,1-phenylene)tris-, polymer with 9,9'-[1,1'-biphenyl]-4,4'-diylbis[3-[(2-propenyloxy)methyl]-9H-carbazole] (9CI) (CA INDEX NAME)

CM 1

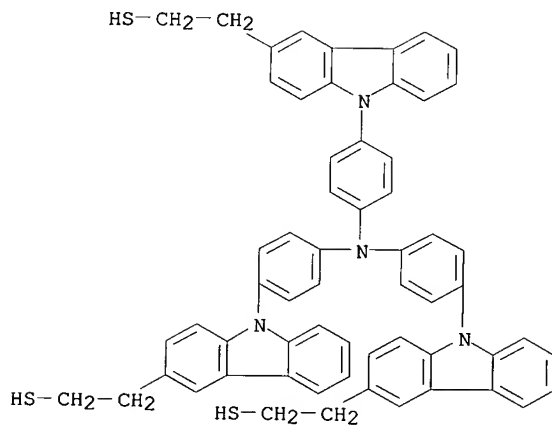
CRN 602299-92-3
 CMF C44 H36 N2 O2



CM 2

CRN 602299-90-1

CMF C60 H48 N4 S3



USHA SHRESTHA

REM 4B28

IC ICM C09K011-06
ICS C08G075-04; H05B033-12; H05B033-14; H05B033-22; H05B033-26
CC 73-11 (**Optical**, Electron, and Mass Spectroscopy and
Other Related Properties)
IT **602299-91-2P 602299-93-4P** 602299-94-5P
(polymerizable compns. for organic light-emitting devices)
REFERENCE COUNT: 5 THERE ARE 5 CITED REFERENCES AVAILABLE
FOR THIS RECORD. ALL CITATIONS AVAILABLE
IN THE RE FORMAT

L14 ANSWER 27 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN
ACCESSION NUMBER: 2003:551817 HCAPLUS
DOCUMENT NUMBER: 139:124827
TITLE: Bis- and tris-(di)benzocarbazole-based
materials as hole transport materials for
organic light emitting devices
INVENTOR(S): Chen, Jian Ping
PATENT ASSIGNEE(S): Canon Kabushiki Kaisha, Japan
SOURCE: PCT Int. Appl., 37 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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WO 2003059014	A1	20030717	WO 2002-US41219	2002 1224
W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW			
RW:	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG			
US 2003186077	A1	20031002	US 2001-29936	2001

PRIORITY APPLN. INFO.:

US 2001-29936

A

1231

2001

1231

OTHER SOURCE(S):

MARPAT 139:124827

GI

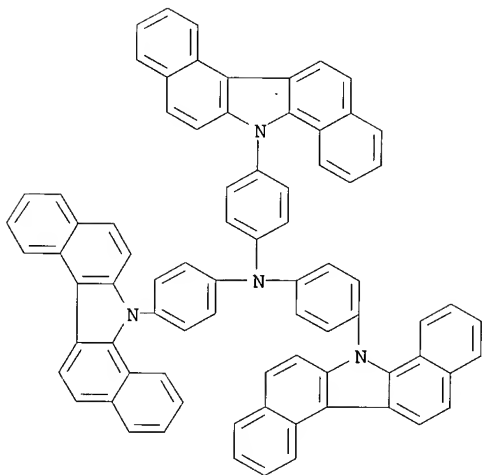
* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT
*

AB Compds. according to formula I or formula II are described where one or two of Ar1-4 are present, R is selected from the group consisting of H, CH3, OCH3 or halogen, and Ar is an aryl bridge. Methods for synthesis of the compds. with formula I and formula II are also discussed as are **electroluminescent** devices employing the compds. as emitting or hole-transporting layers.

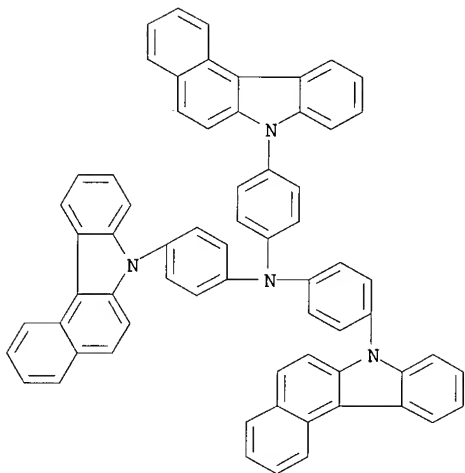
IT **513416-66-5P 562841-45-6P 562841-47-8P**
(bis- and tris-(di)benzocarbazole-based materials as hole transport materials for organic light emitting devices)

RN 513416-66-5 HCAPLUS

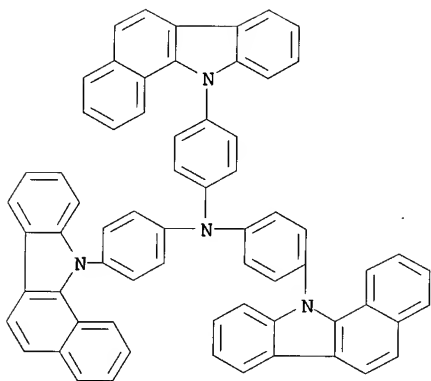
CN Benzenamine, 4-(7H-dibenzo[a,g]carbazol-7-yl)-N,N-bis[4-(7H-dibenzo[a,g]carbazol-7-yl)phenyl]- (9CI) (CA INDEX NAME)



RN 562841-45-6 HCAPLUS
CN Benzenamine, 4-(7H-benzo[c]carbazol-7-yl)-N,N-bis[4-(7H-benzo[c]carbazol-7-yl)phenyl]- (9CI) (CA INDEX NAME)



RN 562841-47-8 HCAPLUS
CN Benzenamine, 4-(11H-benzo[a]carbazol-11-yl)-N,N-bis[4-(11H-benzo[a]carbazol-11-yl)phenyl]- (9CI) (CA INDEX NAME)



IC ICM H05B033-12

ICS H05B033-14; C07D209-82; C07D409-14

CC 73-11 (**Optical**, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 22, 27, 76

IT 227008-35-7P **513416-66-5P** 562841-31-0P 562841-32-1P
 562841-33-2P 562841-34-3P 562841-35-4P 562841-36-5P
 562841-37-6P 562841-38-7P 562841-41-2P 562841-42-3P
 562841-43-4P **562841-45-6P 562841-47-8P**

(bis- and tris-(di)benzocarbazole-based materials as hole transport materials for organic light emitting devices)

REFERENCE COUNT: 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L14 ANSWER 28 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2003:525397 HCAPLUS

DOCUMENT NUMBER: 139:92525

TITLE: α,α,α' -Tris(4-carbonyloxyaryl)-1-alkyl-4-isoalkylbenzene derivatives, their synthesis, hole transporting materials therefrom, and organic electroluminescent devices including the same
 Ueda, Mitsuru; Fukuoka, Naohiko; Tagami, Sanae; Fujiwara, Toru

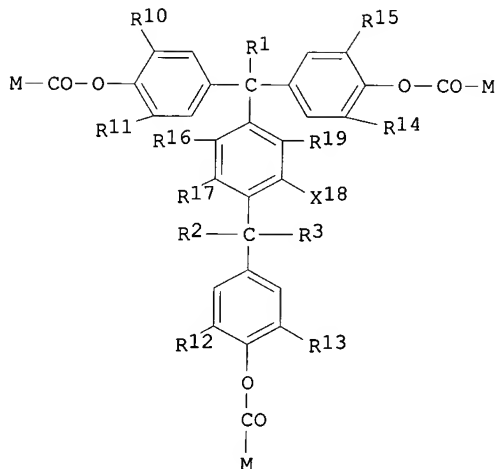
INVENTOR(S):

USHA SHRESTHA REM 4B28

PATENT ASSIGNEE(S): Chemipro Kasei Ltd., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 32 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	
JP 2003192652	A2	20030709	JP 2002-31527	2002 0207
PRIORITY APPLN. INFO.:			JP 2001-235206	A 2001 0802
			JP 2001-317105	A 2001 1015

OTHER SOURCE(S): MARPAT 139:92525
GI



I

AB The derivs. are I [R1-R3 = H, alkyl, aralkyl, aryl; R10-R19 = H, alkyl, (p- or m-alkyl)phenyl; M = (C6H4-mR4m)nQ [m = 1-4; n = 1, 2; R4 = H, alkyl(oxy), (alkyl)phenyl; Q = [alkyl(oxy)-substituted] diphenylamino, phenylnaphthylamino, dinaphthylamino, N-carbazolyl, etc.]], and are synthesized by reaction of corresponding α, α, α' -tris(4-hydroxyaryl)-1-alkyl-4-isoalkylbenzene derivs. and MCO₂H or MCOX (M = the same as above; X = halo). The derivs. are soluble in casting solvents, thereby making formation of hole-transporting layers of organic LED easier.

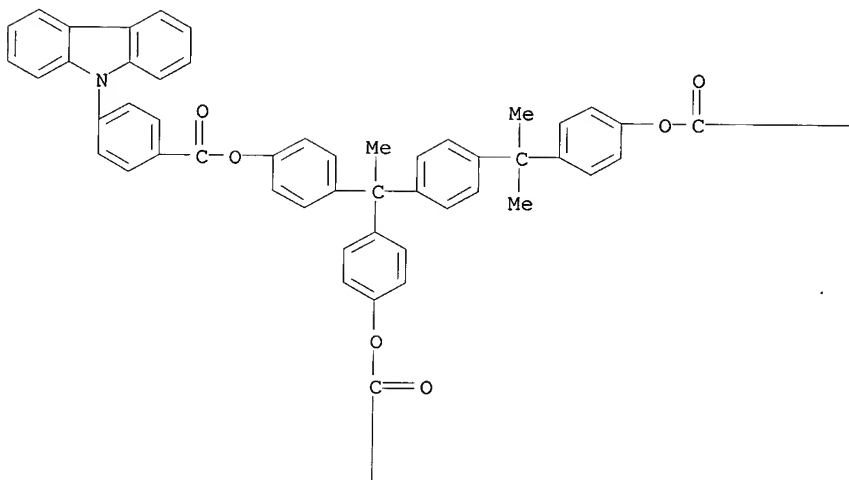
IT **554458-95-6P**

(α, α, α' -tris(4-carbonyloxyaryl)-1-alkyl-4-isoalkylbenzenes forming stable dopes for hole-transporting layers of organic **LED**)

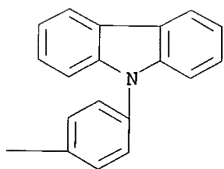
RN 554458-95-6 HCAPLUS

CN Benzoic acid, 4-(9H-carbazol-9-yl)-, [1-[4-[1-[4-[4-(9H-carbazol-9-yl)benzoyl]oxy]phenyl]-1-methylethyl]phenyl]ethylidene]di-4,1-phenylene ester (9CI) (CA INDEX NAME)

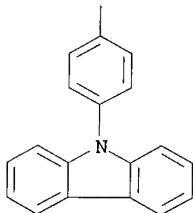
PAGE 1-A



PAGE 1-B



PAGE 2-A



IC ICM C07C229-60
 ICS C07C229-52; C07D209-82; C09K011-06; H05B033-14; H05B033-22
 CC 73-11 (**Optical**, Electron, and Mass Spectroscopy and
 Other Related Properties)
 Section cross-reference(s): 25
 IT Luminescent substances
 (electroluminescent; α, α, α' -tris(4-carbonyloxyaryl)-1-alkyl-4-isoalkylbenzenes forming stable
 dopes for hole-transporting layers of organic **LED**)
 IT Electroluminescent devices
 (α, α, α' -tris(4-carbonyloxyaryl)-1-alkyl-4-isoalkylbenzenes forming stable dopes for hole-transporting
 layers of organic **LED**)
 IT 554458-91-2P 554458-92-3P 554458-93-4P 554458-94-5P
554458-95-6P
 (α, α, α' -tris(4-carbonyloxyaryl)-1-alkyl-4-isoalkylbenzenes forming stable dopes for hole-transporting
 layers of organic **LED**)
 IT 6156-37-2, 4-Diphenylaminobenzoic acid 71935-21-2 110726-28-8
 500303-87-7 554458-96-7 554458-97-8
 (α, α, α' -tris(4-carbonyloxyaryl)-1-alkyl-4-isoalkylbenzenes forming stable dopes for hole-transporting
 layers of organic **LED**)

L14 ANSWER 29 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN
 ACCESSION NUMBER: 2003:472573 HCAPLUS
 DOCUMENT NUMBER: 139:60162
 TITLE: Organic electroluminescent material using
 calixarene or calixresorciarene derivative
 Momoda, Junji; Kawabata, Yuichiro; Otani,
 Toshiaki

USHA SHRESTHA REM 4B28

PATENT ASSIGNEE(S): Tokuyama Corporation, Japan
 SOURCE: PCT Int. Appl., 140 pp.
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2003050201	A1	20030619	WO 2002-JP12821	2002 1206

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

PRIORITY APPLN. INFO.: JP 2001-378448 A 2001
1212

JP 2002-120827 A 2002
0423

JP 2002-208112 A 2002
0717

OTHER SOURCE(S): MARPAT 139:60162

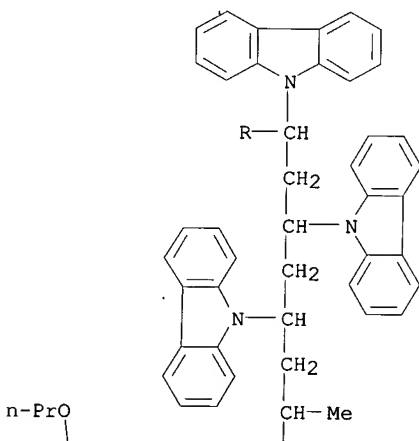
AB The invention refers to an organic **electroluminescent** materials suitable for spin coating, comprising. a calixarene or calixresorciarene derivative with an **organic luminescent** group and/or an organic charge transport group, such as 4-[1-(2,2-diphenylvinyl)- biphenyl-2-phenylvinyl]phenyl.

IT **546631-28-1P 546631-81-6P 546633-06-1P**

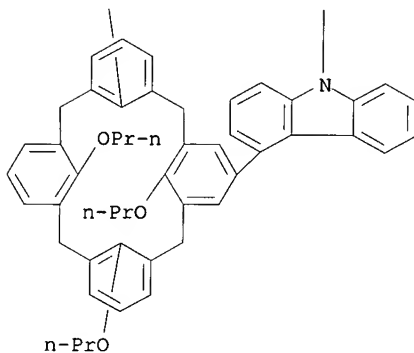
(organic electroluminescent material using calixarene or calixresorciarene derivative)

RN 546631-28-1 HCAPLUS
 CN 9H-Carbazole, 9-[3,5,7,9,11-pentakis(9H-carbazol-9-yl)-1-methylundecyl]-4-(25,26,27,28-tetrapropoxypentacyclo[19.3.1.13,7.19,13.115,19]octacos-1(25),3,5,7(28),9,11,13(27),15,17,19(26),21,23-dodecaen-5-yl)- (9CI) (CA INDEX NAME)

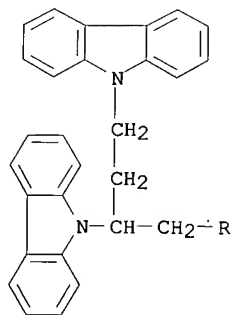
PAGE 1-A



PAGE 2-A



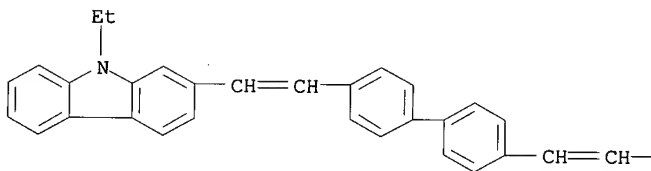
PAGE 3-A



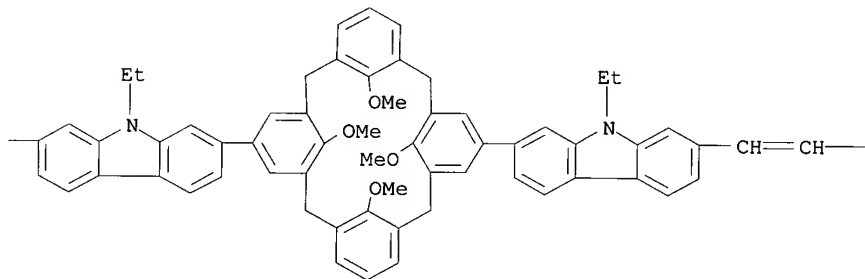
RN 546631-81-6 HCAPLUS
 CN 9H-Carbazole, 2,2'-(25,26,27,28-tetramethoxypentacyclo[19.3.1.13,7
 .19,13.115,19]octacos-1(25),3,5,7(28),9,11,13(27),15,17,19(26),21
 ,23-dodecaene-5,17-diyl)bis[9-ethyl-7-[2-[4'-[2-(9-ethyl-9H-

carbazol-2-yl)ethenyl][1,1'-biphenyl]-4-yl]ethenyl]- (9CI) (CA
INDEX NAME)

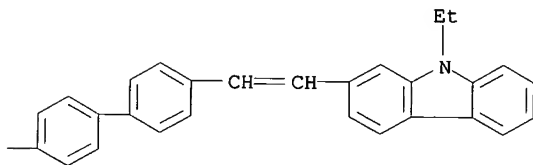
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PAGE 1-B

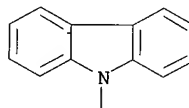
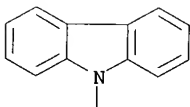


PAGE 1-C

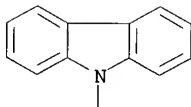


RN	546633-06-1	HCAPLUS
CN	9H-Carbazole, 9,9',9'',9''',9''',9''',9''''- (73,74,75,76,77,78,79,80,81,82,83,84-dodecapropoxytridecacyclo[67. 3.1.13,7.19,13.115,19.121,25.127,31.133,37.139,43.145,49.151,55.15 7,61.163,67]tetraoctaconta-1(73),3,5,7(84),9,11,13(83),15,17,19(82),21,23,25(81),27,29,31(80),33,35,37(79),39,41,43(78),45,47,49(77) ,51,53,55(76),57,59,61(75),63,65,67(74),69,71-hexatriacontaene- 5,17,29,41,53,65-hexayl]hexakis- (9CI) (CA INDEX NAME)	

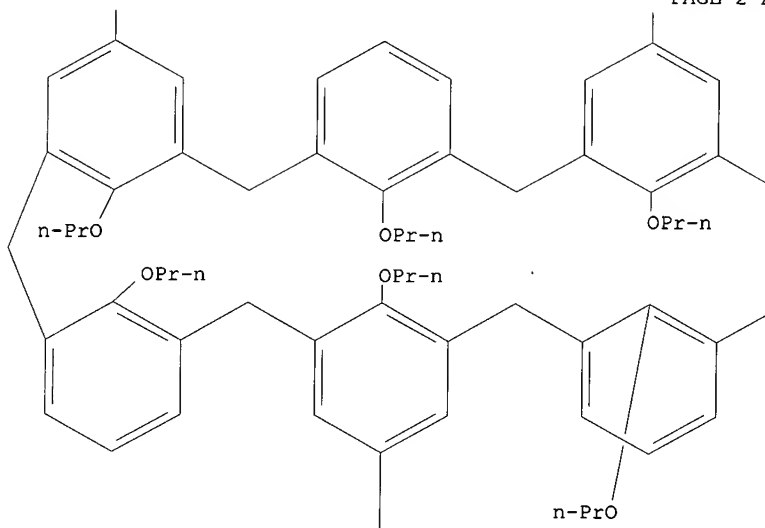
PAGE 1-A



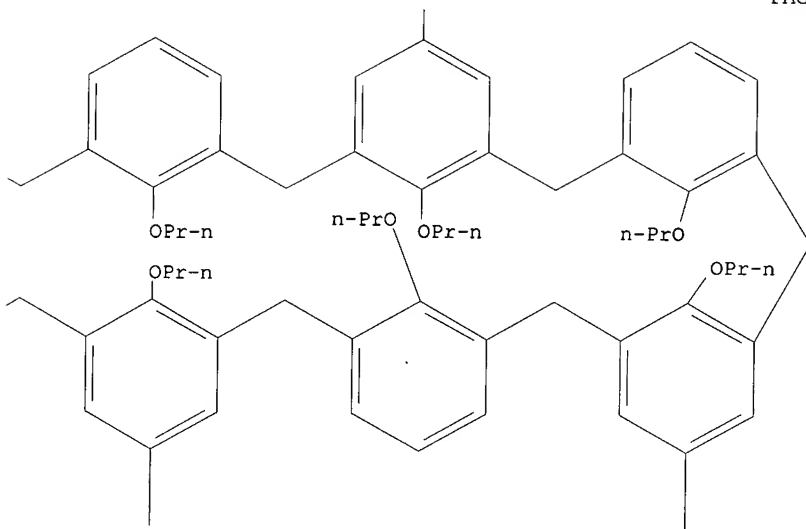
PAGE 1-B



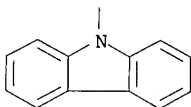
PAGE 2-A



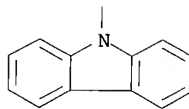
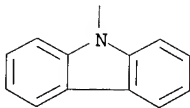
PAGE 2-B



PAGE 3-A



PAGE 3-B



IC ICM C09K011-06
 ICS H05B033-14; H05B033-22; C07C043-215; C07C043-21; C07C043-285;
 C07C211-54; C07C211-61; C07C217-80; C07F007-08; C07F007-10;
 C07D209-86; C07D471-04; C07D471-06; C07D271-10; C07D251-24;
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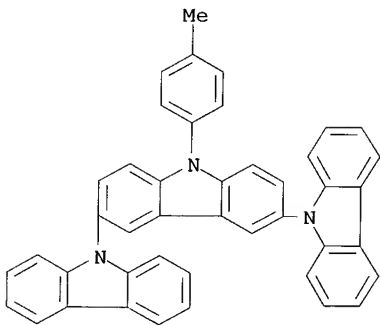
CC 73-11 (**Optical**, Electron, and Mass Spectroscopy and
 Other Related Properties)

IT 546630-96-0P 546631-02-1P 546631-10-1P 546631-20-3P
546631-28-1P 546631-34-9P 546631-43-0P 546631-51-0P
 546631-61-2P 546631-67-8P 546631-73-6P 546631-76-9P
546631-81-6P 546631-90-7P 546631-96-3P 546632-02-4P
 546632-08-0P 546632-16-0P 546632-26-2P 546632-35-3P
 546632-42-2P 546632-48-8P 546632-54-6P 546632-56-8P
 546632-62-6P 546632-74-0P 546632-79-5P 546632-87-5P
 546632-93-3P **546633-06-1P** 546633-19-6P 546633-27-6P
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 546633-70-9P 546633-78-7P 547735-93-3P 547735-95-5P
 547756-86-5P 547756-88-7P 547756-90-1P 547756-92-3P
 547756-97-8P 547756-99-0P 547757-01-7P 547757-04-0P
 547757-05-1P 547757-07-3P 547757-08-4P 547757-21-1P
 547757-32-4P 547757-36-8P 547757-37-9P 547757-39-1P
 547757-42-6P 547757-43-7P 547757-44-8P 547757-46-0P
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 547761-55-7P 547761-91-1P 547762-32-3P 547762-84-5P
 547763-30-4P 547763-53-1P 547763-57-5P 547763-69-9P
 547763-70-2P 547763-71-3P

(organic electroluminescent material using calixarene or
 calixresorciarene derivative)

REFERENCE COUNT: 19 THERE ARE 19 CITED REFERENCES AVAILABLE
 FOR THIS RECORD. ALL CITATIONS AVAILABLE
 IN THE RE FORMAT

L14 ANSWER 30 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN
ACCESSION NUMBER: 2003:417076 HCAPLUS
DOCUMENT NUMBER: 139:140641
TITLE: Carbazole-based hole-transporting materials
for electroluminescent devices
AUTHOR(S): Zhang, Q.; Hu, Y. F.; Cheng, Y. X.; Su, G. P.;
Ma, D. G.; Wang, L. X.; Jing, X. B.; Wang, F.
S.
CORPORATE SOURCE: State Key Laboratory of Polymer Physics and
Chemistry, Changchun Institute of Applied
Chemistry, Chinese Academy of Sciences,
Changchun, 130022, Peop. Rep. China
SOURCE: Synthetic Metals (2003), 137(1-3), 1111-1112
CODEN: SYMEDZ; ISSN: 0379-6779
PUBLISHER: Elsevier Science B.V.
DOCUMENT TYPE: Journal
LANGUAGE: English
AB Two kinds of carbazole-based mols. connected with diphenylamine
and carbazole are synthesized by modified Ullmann reaction.
Comparative study on their thermal stability, redox behavior, hole
injection and transport properties are present. The
carbazole-based mols. are very promising hole-transporting
materials for **electroluminescent** devices.
IT **566143-94-0P**
(DCPC; carbazole-based hole-transporting materials for
electroluminescent devices)
RN 566143-94-0 HCAPLUS
CN 9,3':6',9''-Ter-9H-carbazole, 9'-(4-methylphenyl)- (9CI) (CA
INDEX NAME)



CC 73-11 (**Optical**, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 22, 27, 72, 77

IT Electric current-potential relationship
(of **LEDs** with carbazole-based hole-transporting materials)

IT Electric potential
(turn-on; of **LEDs** with carbazole-based hole-transporting materials)

IT **566143-94-OP**
(DCPC; carbazole-based hole-transporting materials for electroluminescent devices)

IT 2085-33-8, Alq3
(**LEDs** with carbazole-based hole-transporting materials and)

REFERENCE COUNT: 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L14 ANSWER 31 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2003:221276 HCAPLUS

DOCUMENT NUMBER: 139:36191

TITLE: Design, synthesis, and characterization of well-defined amorphous molecules for use in organic LEDs

AUTHOR(S): Robinson, Matthew R.; Bazan, Guillermo C.; Heeger, Allan J.; O'Regan, Marie B.; Wang, Shujun

USHA SHRESTHA REM 4B28

CORPORATE SOURCE: Department of Materials Engineering,
University of California, Santa Barbara, CA,
93106, USA

SOURCE: ACS Symposium Series (2003), 844(Molecules as
Components of Electronic Devices), 187-194
CODEN: ACSMC8; ISSN: 0097-6156

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

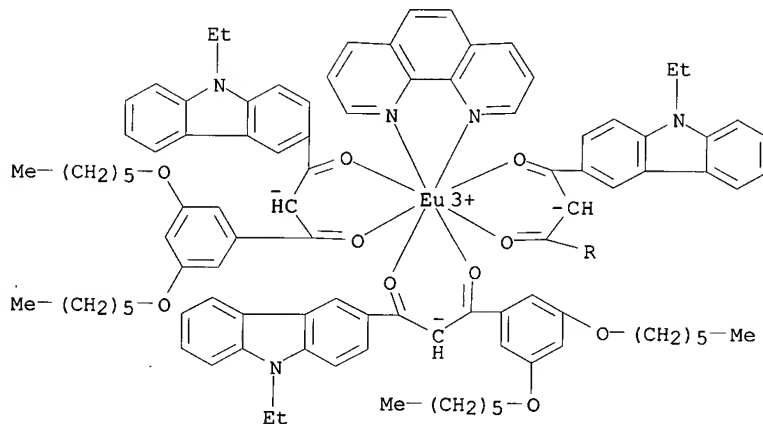
AB Symposium proceedings. Two strategies are presented for making
amorphous organic chromophores with well-defined dimensions that
exploit the superior qualities of polymers and small mols. with
respect to LED fabrication. These qualities are resistance to
crystallization, purity, high luminescence efficiency, and high
solubility
required for spin casting. Tetrakis(4-(4'-(3'',5''-
dihexyloxy)styryl)styryl)stilbenyl)methane (T-4R-OC6H13)
exemplifies a strategy consisting of four oligophenylenevinylene
fragments ("arms") connected to a tetrahedral point of
convergence. Bulk samples are amorphous and the film-forming
qualities are useful for the fabrication of LEDs with low turn-on
voltages. In a related strategy, tris[1-(N-ethylcarbazol-3-
ylcarbonyl)-1-(3,,5-hexyloxybenzoyl)methane]-(phenanthroline)
europium was designed using a modular approach. It incorporates
functionalities for electron and hole transport, solubility, and
resistance to crystallization LEDs were fabricated and studied.

IT **303090-36-0**
(design, synthesis, and characterization of well-defined
amorphous mols. for use in organic **LEDs**)

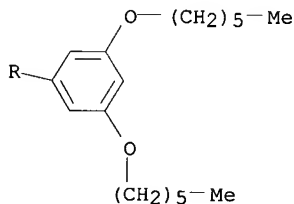
RN 303090-36-0 HCAPLUS

CN Europium, tris[1-[3,5-bis(hexyloxy)phenyl]-3-(9-ethyl-9H-carbazol-
3-yl)-1,3-propanedionato-κO,κO'] (1,10-phenanthroline-
κN1,κN10)- (9CI) (CA INDEX NAME)

PAGE 1-A



PAGE 2-A



CC 22-9 (Physical Organic Chemistry)

Section cross-reference(s): 73

IT 303090-36-0 338460-81-4

(design, synthesis, and characterization of well-defined
amorphous mols. for use in organic LEDs)REFERENCE COUNT: 38 THERE ARE 38 CITED REFERENCES AVAILABLE
FOR THIS RECORD. ALL CITATIONS AVAILABLE

USHA SHRESTHA REM 4B28

IN THE RE FORMAT

L14 ANSWER 32 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2003:132150 HCAPLUS

DOCUMENT NUMBER: 139:14094

TITLE: A field-dependent organic LED consisting of two new high Tg blue light emitting organic layers: a possibility of attainment of a white light source

AUTHOR(S): Cha, Soon Wook; Jin, Jung-Il

CORPORATE SOURCE: Department of Chemistry and the Center for Electro- and Photo-Responsive Molecules, Korea University, Seoul, 136-701, S. Korea

SOURCE: Journal of Materials Chemistry (2003), 13(3), 479-484

CODEN: JMACEP; ISSN: 0959-9428

PUBLISHER: Royal Society of Chemistry

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Two new blue **light emitting** trimeric compds. of the Y-shape type having high glass transition temps. were synthesized and **EL** behavior of LED devices consisting of bilayers of the two compds. was studied. One of the compds. is of hole-transporting type containing carbazole moieties, whereas the other is of electron-transporting type bearing phenyloxadiazole moieties. The bilayer LED devices exhibit a strong field-dependence and **emit white light** (simultaneous **light-emittance** in blue, green and red regions), at high applied elec. fields. Increased interfacial formation of exciplexes at stronger external fields appears to be responsible for this field-dependence.

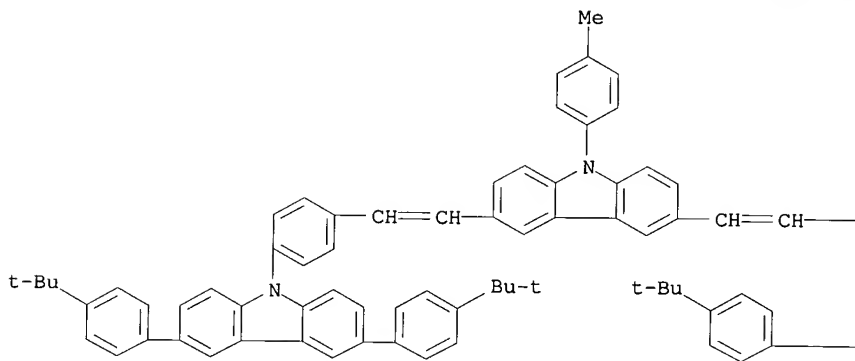
IT 535995-35-8P

(film and in solution; field-dependent organic **LED** consisting of two new high Tg blue-light-emitting organic layers as possibility of attainment of white light source)

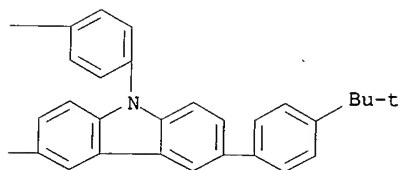
RN 535995-35-8 HCAPLUS

CN 9H-Carbazole, 3,6-bis[2-[4-[3,6-bis[4-(1,1-dimethylethyl)phenyl]-9H-carbazol-9-yl]phenyl]ethenyl]-9-(4-methylphenyl)-(9CI) (CA INDEX NAME)

PAGE 1-A



PAGE 1-B



CC 73-5 (**Optical**, Electron, and Mass Spectroscopy and Other
Related Properties)
Section cross-reference(s): 22, 76

IT Luminescence, electroluminescence
(blue; field-dependent organic **LED** consisting of two new high Tg blue-light-emitting organic layers as possibility of attainment of white light source)

IT Luminescent substances
(electroluminescent, blue-emitting; field-dependent organic **LED** consisting of two new high Tg blue-light-emitting organic layers as possibility of attainment of white light source)

IT Glass transition temperature
Luminescence
UV and visible spectra
(field-dependent organic **LED** consisting of two new high Tg blue-light-emitting organic layers as possibility of attainment of white light source)

IT Exciplex
(interfacial formation of; field-dependent organic **LED** consisting of two new high Tg blue-light-emitting organic layers as possibility of attainment of white light source)

IT Electroluminescent devices
Light sources
(white-emitting; field-dependent organic **LED** consisting of two new high Tg blue-light-emitting organic layers as possibility of attainment of white light source)

IT 12798-95-7 50926-11-9, Indium tin oxide
(electrode; field-dependent organic **LED** consisting of two new high Tg blue-light-emitting organic layers as possibility of attainment of white light source)

IT 86-74-8, Carbazole 99-75-2 106-38-7, 4-Bromotoluene 302-01-2, Hydrazine, reactions 1710-98-1, 4-tert-Butylbenzoyl chloride 23950-59-6, 3,5-Dibromobenzoyl chloride 123324-71-0, 4-tert-Butylphenylboronic acid
(field-dependent organic **LED** consisting of two new high Tg blue light emitting organic layers prepared using)

IT 19264-73-4P
(field-dependent organic **LED** consisting of two new high Tg blue light emitting organic layers prepared using)

IT **535995-35-8P** 535995-36-9P
(film and in solution; field-dependent organic **LED** consisting of two new high Tg blue-light-emitting organic layers as possibility of attainment of white light source)

REFERENCE COUNT: 51 THERE ARE 51 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

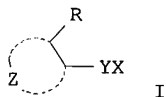
L14 ANSWER 33 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN

USHA SHRESTHA REM 4B28

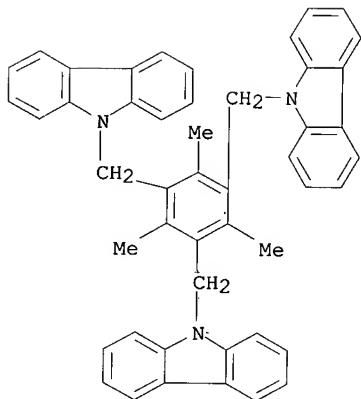
ACCESSION NUMBER: 2002:802413 HCAPLUS
 DOCUMENT NUMBER: 137:317662
 TITLE: Hole-transporting cyclic compound and
 electroluminescent device using it
 INVENTOR(S): Taguchi, Toshiki
 PATENT ASSIGNEE(S): Fuji Photo Film Co., Ltd., Japan
 SOURCE: Jpn. Kokai Tokkyo Koho, 20 pp.
 CODEN: JKXXAF
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2002308837	A2	20021023	JP 2001-107306	2001 0405
PRIORITY APPLN. INFO.:				2001 0405
				2001 0405

OTHER SOURCE(S): MARPAT 137:317662
 GI



- AB The **electroluminescent** device uses ≥ 1 cyclic compound I (X = hole-transporting group; Y = divalent linkage group, none; Z = atomic group to form ≥ 3 -membered ring; R = H, substituent). The device shows high emission and improved durability in repeated use.
- IT **471891-77-7P**
 (hole-transporting cyclic compound for electroluminescent device with improved durability)
- RN 471891-77-7 HCAPLUS
 CN 9H-Carbazole, 9,9',9''-[(2,4,6-trimethyl-1,3,5-benzenetriyl)tris(methylene)]tris- (9CI) (CA INDEX NAME)



IC ICM C07C211-54
 ICS C07D209-86; C07D223-14; C07D223-26; C07D307-91; C07D333-76;
 C07D471-04; C07F007-10; C07F015-00; C09K011-06; H05B033-14;
 H05B033-22
 CC 73-11 (**Optical**, Electron, and Mass Spectroscopy and
 Other Related Properties)
 IT **471891-77-7P**
 (hole-transporting cyclic compound for electroluminescent device
 with improved durability)

L14 ANSWER 34 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN
 ACCESSION NUMBER: 2002:576170 HCAPLUS
 DOCUMENT NUMBER: 137:254828
 TITLE: Green phosphorescent dendrimer for
 light-emitting diodes
 AUTHOR(S): Lo, Shih-Chun; Male, Nigel A. H.; Markham,
 Jonathan P. J.; Magennis, Steven W.; Burn,
 Paul L.; Salata, Oleg V.; Samuel, Ifor D. W.
 CORPORATE SOURCE: The Dyson Perrins Laboratory, University of
 Oxford, Oxford, OX1 3QY, UK
 SOURCE: Advanced Materials (Weinheim, Germany) (2002),
 14(13-14), 975-979
 CODEN: ADVMEW; ISSN: 0935-9648

USHA SHRESTHA REM 4B28

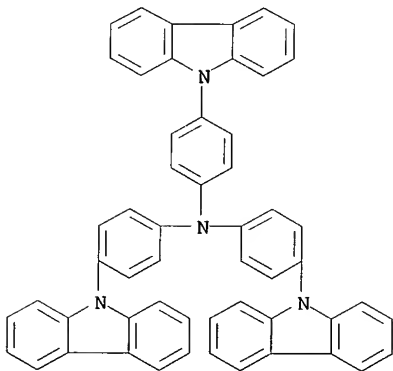
PUBLISHER: Wiley-VCH Verlag GmbH
DOCUMENT TYPE: Journal
LANGUAGE: English

AB High efficiencies were achieved in 2-layer organic LEDs containing a solution-processed light-emitting dendrimer layer and a hole-blocking/electron-transporting layer. The dendrimer consisted of a fac-tris(2-phenylpyridine)iridium core, phenylene dendrons, and 2-ethylhexyloxy surface groups. All the devices prepared used ITO as the anode and LiF/Al as the cathode. The traditional bipolar 4,4'-bis(N-carbazolyl)biphenyl (CBP) and the newer 4,4',4''-tris(N-carbazolyl)triphenylamine (TCTA) were selected as the host materials for comparison. The triphenylamine center was considered to impart greater hole-transport character for TCTA when compared to CBP. The 1,3,5-tris(2-N-phenylbenzimidazolyl)benzene was more stable than 2,9-dimethyl-4,7-diphenyl-1,10-phenanthroline as the electron-transport/hole-blocking layer.

IT 139092-78-7, 4,4',4''-Tris(N-carbazolyl)triphenylamine (LEDs containing iridium bis(ethylhexyloxyphenylene)phenylpyridine dendrimer green phosphorescent complex and)

RN 139092-78-7 HCAPLUS

CN Benzenamine, 4-(9H-carbazol-9-yl)-N,N-bis[4-(9H-carbazol-9-yl)phenyl]- (9CI) (CA INDEX NAME)



CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 76

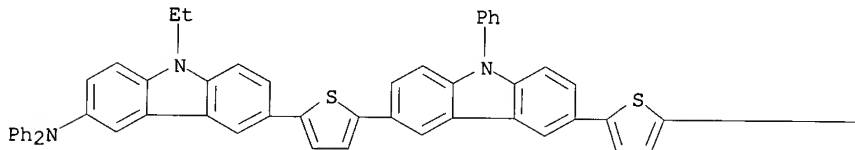
IT 4733-39-5, 2,9-Dimethyl-4,7-diphenyl-1,10-phenanthroline
58328-31-7, 4,4'-Bis(N-carbazolyl)biphenyl 65181-78-4, TPD
139092-78-7, 4,4',4''-Tris(N-carbazolyl)triphenylamine
192198-85-9, 1,3,5-Tris(2-N-phenylbenzimidazolyl)benzene
(**LEDs** containing iridium bis(ethylhexyloxyphenylene)phenylpyridine dendrimer green phosphorescent complex and)
REFERENCE COUNT: 34 THERE ARE 34 CITED REFERENCES AVAILABLE
FOR THIS RECORD. ALL CITATIONS AVAILABLE
IN THE RE FORMAT

L14 ANSWER 35 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN
ACCESSION NUMBER: 2002:152154 HCAPLUS
DOCUMENT NUMBER: 136:316630
TITLE: New Star-Shaped Luminescent Triarylamines:
Synthesis, Thermal, Photophysical, and
Electroluminescent Characteristics
AUTHOR(S): Thomas, K. R. Justin; Lin, Jiann T.; Tao,
Yu-Tai; Ko, Chung-Wen
CORPORATE SOURCE: Institute of Chemistry, Academia Sinica,
Taipei, 115, Taiwan
SOURCE: Chemistry of Materials (2002), 14(3),
1354-1361
CODEN: CMATEX; ISSN: 0897-4756
PUBLISHER: American Chemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English

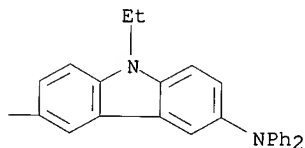
AB 3,6-Disubstituted carbazole and 1,3,5-trisubstituted benzene
derivs. incorporating thienyl aromatic (Ph, fluorenyl, and
carbazolyl) conjugation and end-capped diphenylamine were
synthesized by iterative C-N and C-C coupling procedures. The
carbazole derivs. **emit** blue **light** and the
star-shaped benzene derivs. emit either blue or bluish green color
depending on the conjugation segment. In general, they possess
high glass transition temps. (>120°) and decomposition temps.
(>520°). Double-layer organic **light-emitting** devices were successfully fabricated using these
novel mols. as hole-transporting and emitting materials. Devices
of the configuration ITO/HTM/TPBI/Mg:Ag display blue to green
emission from the HTM layer while in the devices of the
configuration ITO/HTM/Alq3/Mg:Ag, a typical green emission from
the Alq3 layer was observed
IT **410547-41-0P 410547-43-2P 410547-44-3P**
410547-47-6P
(synthesis, thermal, photophys., and electroluminescent

characteristics of new star-shaped luminescent triarylamines)
 RN 410547-41-0 HCAPLUS
 CN 9H-Carbazol-3-amine, 6,6'-[(9-phenyl-9H-carbazole-3,6-diyl)di-5,2-thiophenediyl]bis[9-ethyl-N,N-diphenyl- (9CI) (CA INDEX NAME)

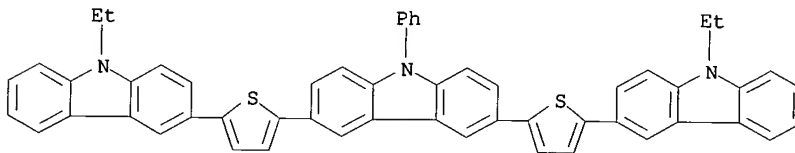
PAGE 1-A



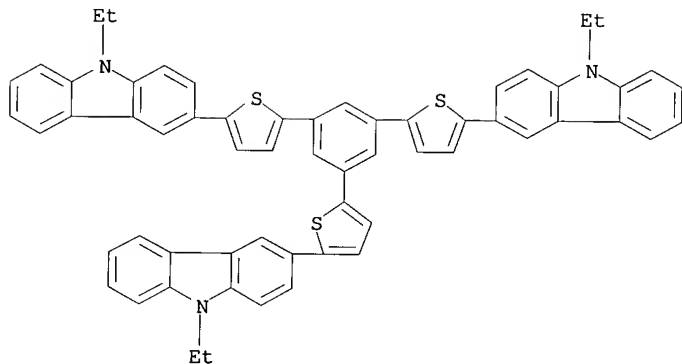
PAGE 1-B



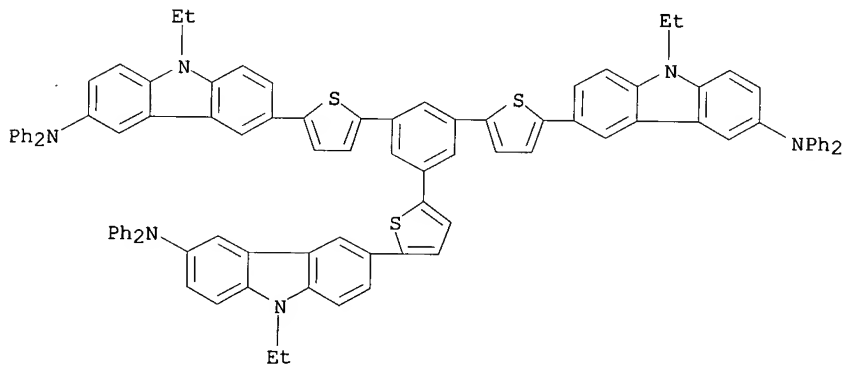
RN 410547-43-2 HCAPLUS
 CN 9H-Carbazole, 3,6-bis[5-(9-ethyl-9H-carbazol-3-yl)-2-thienyl]-9-phenyl- (9CI) (CA INDEX NAME)



RN 410547-44-3 HCAPLUS
 CN 9H-Carbazole, 3,3',3''-(1,3,5-benzenetriyltri-5,2-thiophenediyl)tris[9-ethyl- (9CI) (CA INDEX NAME)



RN 410547-47-6 HCAPLUS
 CN 9H-Carbazol-3-amine, 6,6',6''-(1,3,5-benzenetriyltri-5,2-thiophenediyl)tris[9-ethyl-N,N-diphenyl- (9CI) (CA INDEX NAME)



CC 73-11 (Optical, Electron, and Mass Spectroscopy and
 Other Related Properties)
 IT 410547-39-6P 410547-40-9P 410547-41-0P 410547-42-1P

USHA SHRESTHA REM 4B28

410547-43-2P 410547-44-3P 410547-45-4P

410547-46-5P 410547-47-6P 410547-48-7P

(synthesis, thermal, photophys., and electroluminescent characteristics of new star-shaped luminescent triarylamines)

REFERENCE COUNT: 71 THERE ARE 71 CITED REFERENCES AVAILABLE
FOR THIS RECORD. ALL CITATIONS AVAILABLE
IN THE RE FORMAT

L14 ANSWER 36 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2001:587248 HCAPLUS

DOCUMENT NUMBER: 135:172861

TITLE: Biscarbazolylbiscarbazyl hole-transporting
compound, its manufacture, and
electroluminescent device using it with high
thermal stability

INVENTOR(S): Lee, Ji Hoon; Ki, In So; Cho, Song Woo; Che,
Byong Hoon

PATENT ASSIGNEE(S): Samsung Sdi Co., Ltd., S. Korea

SOURCE: Jpn. Kokai Tokkyo Koho, 13 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO. -----	KIND ---	DATE -----	APPLICATION NO. -----	DATE
JP 2001220380	A2	20010814	JP 2000-121836	2000 0421
JP 3335985	B2	20021021		
KR 2001077773	A	20010820	KR 2000-5814	2000 0208
US 2001046612	A1	20011129	US 2001-778859	2001 0208
US 6451461	B2	20020917		
PRIORITY APPLN. INFO.:			KR 2000-5814	A 2000 0208

OTHER SOURCE(S): MARPAT 135:172861

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USHA SHRESTHA REM 4B28

* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT

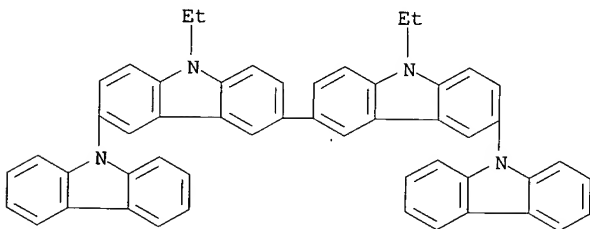
AB The hole-transporting compound is a 5,5'-bis(9H,9-carbazolyl)-N,N'-disubstituted-3,3'-bicarbazyl derivative I (R = H, C1-12 aliphatic alkyl, branched alkyl, cyclic alkyl, C4-14 arom group; R may be substituted with 1 or 2 alkoxy or amine). The electroluminescent device uses I as a hole-transporting agent and has a laminated structure of A/H/L/C, A/B/H/L/C, A/H/L/E/C, A/H/L/E/HS/C, or A/B/H/L/E/HS/C (A = anode, B = buffer layer, H = hole-transporting layer, L = light-emitting layer, E = electron-transporting layer, HS = hole-shielding layer, C = cathode). I is manufactured by (1) mixing CHCl₃ solution of N-substituted carbazole with Fe chloride-dispersed CHCl₃ to prepare N,N'-disubstituted 3,3'-bicarbazyl II, (2) reacting II with halogens or halides to prepare N,N'-disubstituted 5,5'-dihalo-3,3'-bicarbazyl III (X = halo), and (3) reacting III with carbazole in aromatic solvents. The device shows high efficiency and long service life.

IT **354135-64-1P 354135-69-6P**

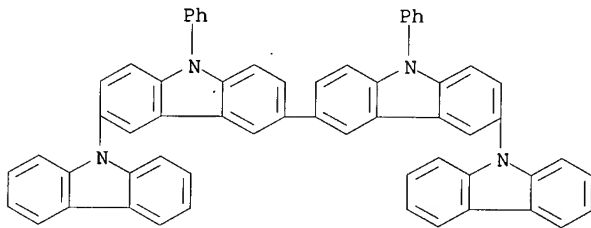
for (manufacture of biscarbazolylbiscarbazyl hole-transporting agent electroluminescent device with high thermal stability)

RN 354135-64-1 HCAPLUS

CN 9,3':6',3'':6'',9'''-Quater-9H-carbazole, 9',9''-diethyl- (9CI)
(CA INDEX NAME)



RN 354135-69-6 HCAPLUS
CN 9,3':6',3'':6'',9'''-Quater-9H-carbazole, 9',9'''-diphenyl- (9CI)
(CA INDEX NAME)



IC C07D209-88; C09K011-06; H05B033-14; H05B033-22
CC 73-11 (**Optical**, Electron, and Mass Spectroscopy and
Other Related Properties)
Section cross-reference(s): 27
IT **354135-64-1P 354135-69-6P**
(manufacture of biscarbazolylbiscarbazyl hole-transporting agent
for
electroluminescent device with high thermal stability)

L14 ANSWER 37 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN
ACCESSION NUMBER: 2001:468675 HCAPLUS
DOCUMENT NUMBER: 135:233551
TITLE: Diphenylthienylamine-Based Star-Shaped
Molecules for Electroluminescence Applications
AUTHOR(S): Wu, Iuan-Yuan; Lin, Jiann T.; Tao, Yu-Tai;
Balasubramaniam, E.; Su, Yi Zhen; Ko,
Chung-Wen
CORPORATE SOURCE: Institute of Chemistry, Academia Sinica,
Taipei, 115, Taiwan
SOURCE: Chemistry of Materials (2001), 13(8),
2626-2631
CODEN: CMATEX; ISSN: 0897-4756
PUBLISHER: American Chemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English
AB Star-shaped compds. containing a triphenylamine as the central core
and 3 diphenylthienylamines (NAr1Ar2(th): 3a, Ar1 = Ar2 = Ph; 3b,
Ar1 = Ph and Ar2 = 3-tolyl; 3c, Ar1 = Ph and Ar2 = 1-naphthyl; 3d,

NAr1Ar2 = carbazolyl) as the peripheral functional groups were synthesized and characterized. These compds. exhibit 4 successive reversible 1-electron redox processes except for 3d in which only two 1-electron reversible oxidation waves are observed. The compds.

3a-d

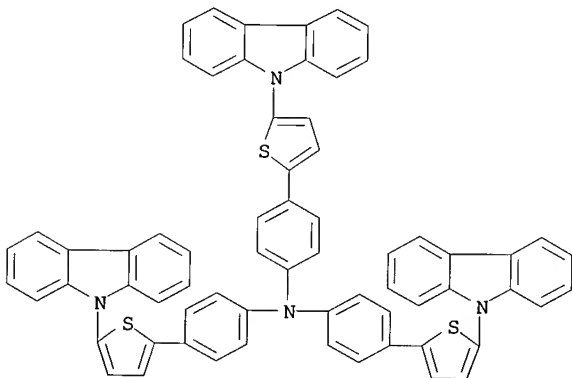
can be used as hole transport materials, and **electroluminescent** devices ITO/3/Alq [tris(8-quinolinolato)aluminum]/Mg:Ag **emit green light** characteristic of Alq. The device ITO/3d/BCP (bathocuproine)/Alq/Mg:Ag is blue emitting, in which 3d is the luminophor.

IT **358722-04-0P**

(phenylthienylamine-based star-shaped mols. for electroluminescence applications)

RN 358722-04-0 HCAPLUS

CN Benzenamine, 4-{5-(9H-carbazol-9-yl)-2-thienyl}-N,N-bis[4-[5-(9H-carbazol-9-yl)-2-thienyl]phenyl]- (9CI) (CA INDEX NAME)



CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 22, 72, 76

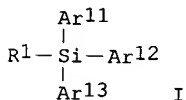
IT 358722-01-7P 358722-02-8P 358722-03-9P **358722-04-0P**
(phenylthienylamine-based star-shaped mols. for electroluminescence applications)

REFERENCE COUNT: 28 THERE ARE 28 CITED REFERENCES AVAILABLE

FOR THIS RECORD. ALL CITATIONS AVAILABLE
IN THE RE FORMAT

L14 ANSWER 38 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN
 ACCESSION NUMBER: 2000:887759 HCAPLUS
 DOCUMENT NUMBER: 134:63641
 TITLE: Silane compounds and luminescent materials
 INVENTOR(S): Igarashi, Tatsuya; Taguchi, Toshiki
 PATENT ASSIGNEE(S): Fuji Photo Film Co., Ltd., Japan
 SOURCE: Jpn. Kokai Tokkyo Koho, 30 pp.
 CODEN: JKXXAF
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO. -----	KIND ----	DATE -----	APPLICATION NO. -----	DATE
JP 2000351966	A2	20001219	JP 2000-70609	2000 0314
US 6310231	B1	20011030	US 2000-543749	2000 0405
PRIORITY APPLN. INFO.:			JP 1999-100416	A 1999 0407
			JP 2000-70609	A 2000 0314
OTHER SOURCE(S):	MARPAT 134:63641			
GI				

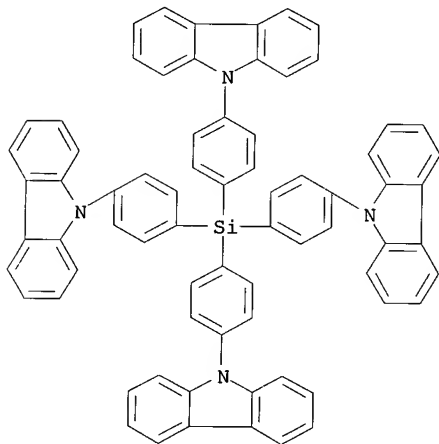


AB The invention refers to a high-efficiency, high-durability **organic luminescent** compound I [R1 = alkyl, aryl, heteroaryl, alkynyl; Ar11-13 = heteroaryl].

IT **313688-97-0P**
(silane compds. and luminescent materials)

RN 313688-97-0 HCAPLUS

CN 9H-Carbazole, 9,9',9'',9'''-(silanetetrayltetra-4,1-phenylene)tetrakis- (9CI) (CA INDEX NAME)



IC ICM C09K011-06
ICS C09K011-06; C07F007-08; C07F007-10; H05B033-14; C08G077-60

CC 73-11 (**Optical**, Electron, and Mass Spectroscopy and Other Related Properties)

IT 313688-96-9P **313688-97-0P** 313688-98-1P
(silane compds. and luminescent materials)

L14 ANSWER 39 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 1998:555770 HCAPLUS

DOCUMENT NUMBER: 129:223051

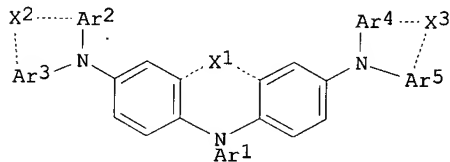
TITLE: Triamine compound and high-luminance organic field-effect electroluminescent device containing it

USHA SHRESTHA REM 4B28

INVENTOR(S): Kawamura, Hisayuki; Hosokawa, Chishio
 PATENT ASSIGNEE(S): Idemitsu Kosan Co., Ltd., Japan
 SOURCE: Jpn. Kokai Tokkyo Koho, 16 pp.
 CODEN: JKXXAF
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

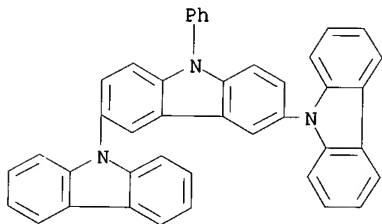
PATENT NO. -----	KIND ---	DATE -----	APPLICATION NO. -----	DATE
JP 10226785	A2	19980825	JP 1997-29938	1997 0214
PRIORITY APPLN. INFO.:			JP 1997-29938	1997 0214

OTHER SOURCE(S): MARPAT 129:223051
 GI



- AB The triamine compound comprises I [Ar1 = (substituted) C6-18 aryl; Ar2-5 = (substituted) C6-18 arylene; X1-3 = single bond, O, S, (CH2)_n, CMe2; n = 1-6]. The device having an organic **light emitting** layer contains I. I may be a hole-injecting or -transporting material. The device showed high luminance, good heat resistance, and long lifetime.
- IT **211685-96-0P**
 (triamine compound for organic field-effect electroluminescent device with good heat resistance)
- RN 211685-96-0 HCAPLUS

CN 9,3':6',9''-Ter-9H-carbazole, 9'-phenyl- (9CI) (CA INDEX NAME)



IC ICM C09K011-06
 CC 73-11 (**Optical**, Electron, and Mass Spectroscopy and
 Other Related Properties)
 Section cross-reference(s): 25
 IT 211685-93-7P 211685-94-8P 211685-95-9P **211685-96-0P**
 (triamine compound for organic field-effect electroluminescent
 device with good heat resistance)

L14 ANSWER 40 OF 40 HCAPLUS COPYRIGHT 2005 ACS on STN
 ACCESSION NUMBER: 1997:113320 HCAPLUS
 DOCUMENT NUMBER: 126:164065
 TITLE: Organic thin-film LED and manufacture thereof
 INVENTOR(S): Nanba, Noryoshi; Nakayama, Masatoshi;
 Nakatani, Kenji
 PATENT ASSIGNEE(S): Tdk Electronics Co Ltd, Japan
 SOURCE: Jpn. Kokai Tokkyo Koho, 11 pp.
 CODEN: JKXXAF
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 08333568	A2	19961217	JP 1995-166954	1995 0608
PRIORITY APPLN. INFO.:				1995
				1995

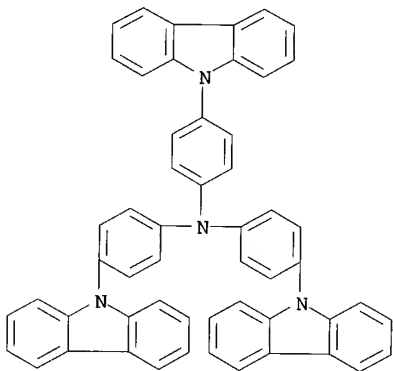
0608

AB A long-life LED comprises a hole-injection or a hole-injection/transport layer formed by glow-discharge polymerization of
 ≥1 monomer having 1-12 aromatic ring(s) interconnected by hole-transporting N-containing bridge(s).

IT **139092-78-7**, 4,4',4''-Tris(N-carbazolyl)triphenylamine
 (manufacture of organic thin-film **LED**)

RN 139092-78-7 HCAPLUS

CN Benzenamine, 4-(9H-carbazol-9-yl)-N,N-bis[4-(9H-carbazol-9-yl)phenyl]- (9CI) (CA INDEX NAME)



IC ICM C09K011-06
 ICS H01L033-00; H05B033-22

CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
 Section cross-reference(s): 38

IT 62-53-3, Aniline, uses 603-34-9, Triphenyl amine 2085-33-8, Tris(8-quinolinolato)aluminum 7664-41-7, Ammonia, uses 7727-37-9, Nitrogen, uses 14118-16-2, N,N,N',N'-Tetraphenyl-p-phenylenediamine 65181-78-4, N,N'-Diphenyl-N,N'-bis(3-methylphenyl)-[1,1'-biphenyl]-4,4'-diamine 116153-35-6 123847-85-8 126717-23-5, 1,3,5-Tris(diphenylamino)benzene 138143-23-4, 1,3,5-Tris(3-methylphenylphenylamino)benzene **139092-78-7**, 4,4',4''-Tris(N-carbazolyl)triphenylamine

151888-76-5 186256-01-9 186256-02-0 186258-38-8
187182-39-4
(manufacture of organic thin-film **LED**)